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Trichocereus spachianus

Punata, Bolivia

Photo:- F. Vandenbroeck

At Quitor

Near Guatin

Near Guatin

Tephrocactus north of San Pedro de Atacama

Photos: H.Sonnermo

FINDING SOME TEPHROCACTUS AROUND SAN PEDRO DE ATACAMA. From H.Sonnermo.

It was October when we were travelling from Calama towards San Pedro de Atacama and we were some way to the east of Calama, in a very dry area, when we saw some cushions of Tephrocactus here and there along a stretch of the road. But there were more of these plants to be seen as we were crossing some higher ground at about 3000m altitude near Barros Arana. These plants were growing in either almost level, stony ground, or on stony slopes. There were also a few dwarf bushes, scattered well apart and up to almost 1m high, growing in company with them. More of these cushions of Tephrocactus were seen as we went downhill on the east side of the mountain range.

These cushions of Tephrocactus were of various sizes, small and large clumps, up to about 2m across and up to almost 1m high at the centre. There were only one or two yellow flowers to be seen on these plants. We thought that they could be Tephrocactus camachoi. There were some dwarf bushes growing around the Tephrocacti.

At about 50km to the east of Calama we took a side road leading up to as far as Rio Grande, a hamlet in the mountains with only a few dwellings. The road felt rather dangerous in places because of the huge boulders which covered the slopes at both sides of the road. As we climbed into the mountains we came across more clumps of Tephrocactus. In some places they grew on more or less level ground. whilst others were seen on slopes with stones which were fairly loose underfoot and were so steep that it was quite difficult to climb up in order to look at these Tephrocacti more closely. The cushions were again of a similar size to those that we had seen to the east of Calama, but there were some yellow flowers to be seen on these plants. In the vicinity of Rio Grande there were some small numbers of Trichocereus atacamensis to be seen, which carried a few fruits and an occasional flower. We did find two young plants about 10cm tall.

Travelling north from San Pedro de Atacama we came to Guatin, near Puritama. Here we found more cushions of Tephrocactus on the hillsides, many of them as big as those we had seen to the east of Calama. The yellow flowers were quite common here, but we also saw other cushions of Tephrocactus here of similar appearance, but with pink flowers, and others with orange flowers. We did think that there were two species of Tephrocactus growing here - one of them T.glomeratus, which had more curved spines and looked quite different to the T.camachoi, but we did not find any fruit on either of them to be able to look at the seeds. There were also a great many Trichocereus atacamensis growing here, many of them in flower. We also saw a few Oreocereus here, but none of them were in flower.

Near Quitor we came across more plants of Tephrocactus, at one spot growing in fine sand where some plants had only the tops of the uppermost segments above what was probably wind blown sand. We also saw other Tephrocactus growing in the same manner at other places in this area.

.....from R.Moreton

On a visit to northern Chile we went inland from Antofagasta, via Calama, to San Pedro de Atacama, from where we turned north to climb the Cuesta Diablo and on from there towards the El Tatio geyser.

On the ascent of Cuesta Diablo we first saw a few Trichocereus atacamensis and then many hundreds of clumps of Tephrocactus. We stopped just as the sun was going down, to look at these clumps, which were up to about 2m across and about 1m high. There were two groups of these plants, showing two distinct spine colours, one group with red spines which showed up brilliantly in the evening sun, and the other group with golden spines. These two groups were intermingled, growing barely a stone's throw apart from each other. We thought that the red spined plants were Tephrocactus ignescens, the others possibly T.camachoi.

There were no flowers on these plants at the time of our visit at the end of January, but there were ripe fruit on the plants with the tan coloured spines, whose seed enabled us to label them as T.camachoi. We did not see any fruits on the red-spined plants, which we now call T.ignescens. There was an appreciable difference in the size of the segments between each of these two groups and in the length and attitude of the spination.

There were also some T.conoideus to be seen close to this stopping place, growing only one or two segments above the surface of the ground, but it has an enormous carrot shaped tuberous root. Some of these plants were in flower. There was also another Tephrocactus to be seen which grew only about 12 to 15 inches tall, with bright green segments, which we were unable to identify.

Continuing to travel north, prior to reaching El Tatio we took the road to Caspala, coming to the type location of Soehrensia uebelmanniana. Here we saw more T.conoideus, one or two with yellow flowers, as well as more big clumps of the golden spined Tephrocactus which here had neither flowers nor fruit.

.....from H.Middleditch

Could the clumps of Tephrocactus seen by R.Moreton which were only about a foot high, be comparable to the smaller one in the photographs from A.W.Craig on the inside front cover of Chileans No.60 of two clumps of Tephrocactus growing side by side, of different size and each with a distinctly different size of segment and flower?

.....from R.M.Ferryman

Our first sighting of Tephrocactus camachoi was at 40km after Calama on the old road to San Pedro de Atacama, which is very probably the Type locality. It was on the flat plain and into the small hills alongside. It seems to prefer growing at altitudes of betwen 3000-4000m, which could explain why it does not grow at the lower altitudes near Calama, where a similar terrain and associated flora are to be found. Probably the Tephrocactus to be found on the stretch from 38 to 50km after leaving Calama, when crossing an elevated stretch of Sierra, would be at the limit of their distribution. Numerous large mounds can be seen there but many of them which have reached a meter across are dying back in the centre. Regeneration is not high.

Continuing north through Puritama and on to Cuesta Diablo, the same form appears, with both yellow

flowers and a similar fruit, which have a few small areoles over their exterior. On the Cuesta Diablo we found a form of Tephrocactus with red flowers, and also fruit, which displayed a larger and more elongated segment than on T.camachoi. This same form of Tephrocactus is to be found at El Tatio at 4300m altitude.
.....from F.Kummel, K.u.a.S. 59 (1) 2008. Abstracts.

The Atacama is a desert of stone and gravel. It rates as the driest desert in the world and is almost totally lacking in vegetation. At Calama, which lies within the compass of the Atacama desert at 2260m, the average rainfall is only 3.9mm per year. There are plants of the genera Maihueniopsis, Cumulopuntia, Trichocereus, and Oreocereus to be found in the area lying between Calama and El Tatio, which occupy the ground between 2500m and 4300m.

To the east the desert is bounded by the pre-Puna zone which is very poor in species, but nevertheless the majority of the cacti are to be found here. In the upper part of the zone, there are columnar cacti at about 3000m on the tops and sides of the mountains. The Trichocereus atacamensis readily catch the eye on account of their size. They attain heights of up to 7m and can be 50cm in diameter at the base. Even specimens of 4 to 5m high carry a dense spination of 4 to 5cm in length, together with central spines of up to 20cm in length. The more mature growth on the upper part of the stems is noticeably different, consisting of only short, bristle-like and pale coloured spination.

Growing in company with this Trichocereus and occurring in greater numbers are the hemispherical clumps which can be regarded as Cumulopuntia ignescens. Their typical aspect is exemplified by the colour, shape, and size, certainly marking them out when growing at higher altitude, where the hemispherical clumps attain a diameter of 30 to 50cm and their spination varies from a white to a brownish colour.

In addition, among the plants growing on level plains at high altitude we also found the first occurrence of Maihueniopsis glomeratus, which were to be found as far as up to 3500m altitude.
.....from E. and N.Sarnes

Travelling west from El Tatio, towards Caspana, at 3630m a few km after the Cuesta de Chita, we came across some clumps of Tephrocactus, some of which carried just one or two flowers. These flowers varied from yellow to pink, with all transitions between these two colours, including orange. The spine colour was also very variable. We are convinced that all the plants at this location are the same species. To the northwest of San Pedro de Atacama you can often find yellow and rose to red coloured flowers at the same habitat. This seems to be quite usual and can be watched also in our greenhouse plants. Flowers start with a yellow colour and day by day they turn to red.
.....from F.Kummel

In 1996, going along the road from Calama to El Tatio, at an altitude of about 3100m, there were many plants of Maihueniopsis camachoi to be seen, with flowers that had green stigmas which would be typical for this species, but on only one flower did I see a red stigma.
.....from P.Taschner.

We have seen M.camachoi between Calama and San Pedro de Atacama, and also between San Pedro and El Tatio - at Banos de Puritama - which were carrying flowers, always of a yellow colour. In the book “Cactaceas en la flora silvestre de Chile” 2004 by Hoffmann and Walter, it is explicitly written that camachoi has a flower with a purple stigma and they illustrate that with a picture.
.....from Herbarium record, Zurich City Succulent Collection

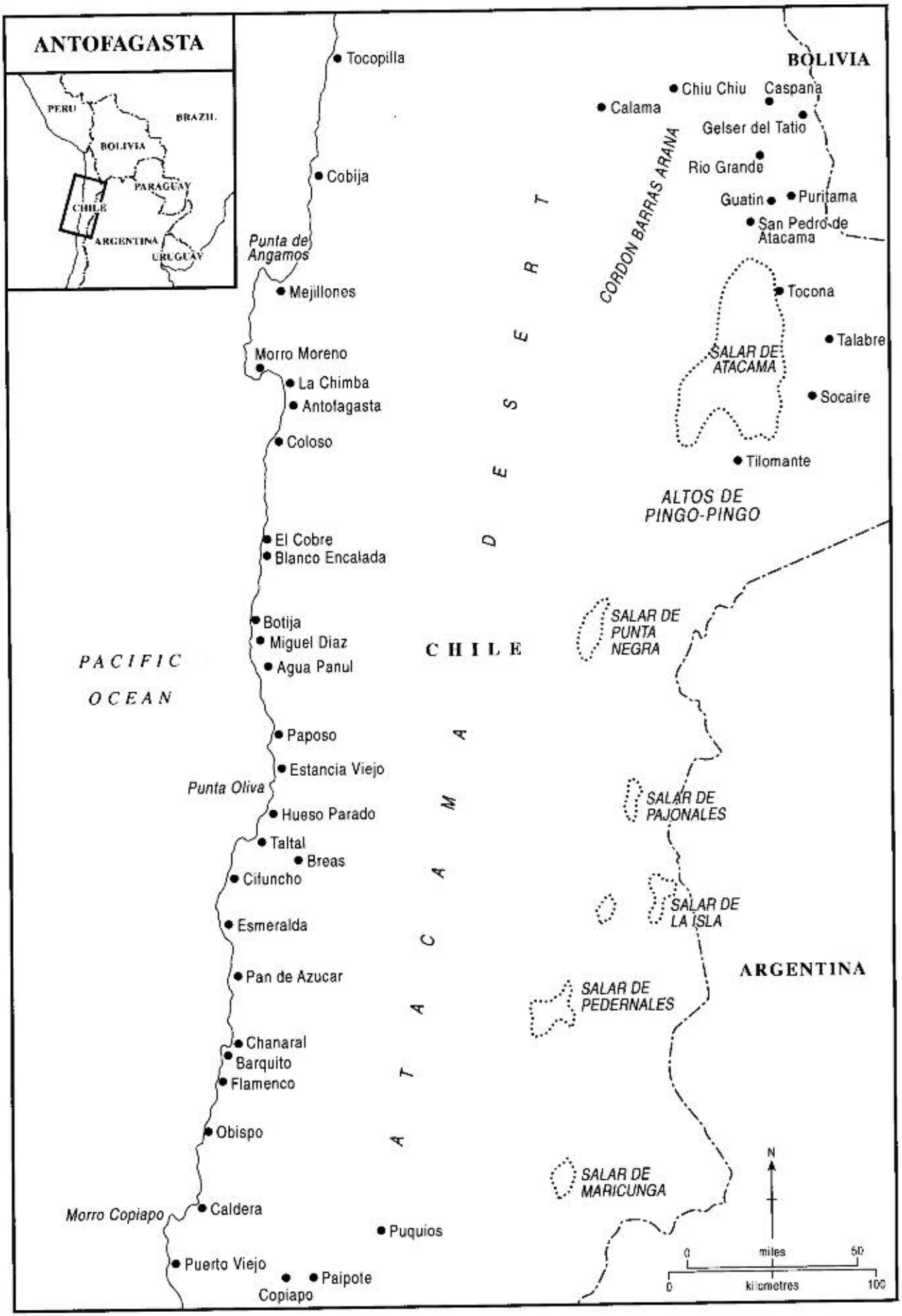
Opuntia camachoi, E & L 2714 from S.E. of San Pedro de Atacama towards Paso Sico = 31 km S.E. of Tocanao. Locally very common and variable as to segment size and shape and spine orientation and colour. Flowers - 3 observed (21.2.1997) pericarpel massive, style massive, stigma green on one flower, purple on two flowers - perhaps this colour only developing towards the end of anthesis.
.....from C.Sherrah

Travelling from Calama to San Pedro de Atacama I stopped to look at some of the numerous clumps of Tephrocactus to be seen, many with pale coloured spines, but some with red-to-brown spines. There were some flowers on these plants and I removed one unopened flower and cut it in two, to find that the stigma was a red colour. When travelling south from San Pedro de Atacama, we were near Talabre at 3344m altitude where we had a look at some more clumps of Tephrocactus, also with yellow flowers, some with a green stigma and some with a red or dark purple stigma
.....from H.Middleditch.

The observations recorded in this review from those who have travelled from Calama to San Pedro de Atacama appear to agree that the clumps of Tephrocactus to be seen on the higher ground between these two places are T.camachoi. Hence it would appear from this last observation that the flowers on these plants can have a stigma that may be either green or red in colour.

In the original description of T.camachoi, the segments are quoted as 3 to 4 cm long, but the observations on segment size provided by R.Ferryman would suggest a much wider range of segment size in nature. There also appears to be some diversity of views on the typical stigma colour to be found on the yellow flowers of T.camachoi.
.....from P.Hoxey

During a visit to Peru we went to the Type locality for Cumulopuntia ignescens at Sumbay, inland from the city of Arequipa and we also saw these plants in the department of Arequipa near the Colca canyon. There were fruit on these plants, but no flowers were seen. In northern Chile, to the north of San Pedro, near El Tatio and also on the road to Machuca, we found plants forming hummocks with a very dense covering of golden yellow spination. From a distance they look quite similar to the clumps of grass with a similar colour that grew intermingled with them. Here they were seen with fiery red flowers which matches what has been described for the ignescens from Sumbay - I did not see any significant difference between the plants we saw near


ANTOFAGASTA
PERU
BRAZIL
BOLIVIA
PARAGUAY
CHILE
ARGENTINA
URUGUAY
Tocopilla
Cobija
Punta de Angamos
Mejillones
Morro Moreno
La Chimba
Antofagasta
Coloso
El Cobre
Blanco Encalada
Botija
Miguel Diaz
Agua Panul
Paposo
Estancia Viejo
Punta Oliva
Hueso Parado
Taltal
Breas
Cifuncho
Esmeralda
Pan de Azucar
Chanaral
Barquito
Flamenco
Obispo
Morro Copiapo
Caldera
Puquios
Puerto Viejo
Paipote
Copiapo
PACIFIC OCEAN
CHILE
ATACAMA DESERT
CORDON BARRAS ARANA
BOLIVIA
Chiu Chiu
Caspana
Calama
Gelser del Tatio
Rio Grande
Guatin
Puritama
San Pedro de Atacama
Tocona
Talabre
SALAR DE ATACAMA
Socaire
Tilomante
ALTOS DE PINGO-PINGO
SALAR DE PUNTA NEGRA
SALAR DE PAJONALES
SALAR DE LA ISLA
ARGENTINA
SALAR DE PEDERNALES
SALAR DE MARICUNGA
N
0
miles
50
0
kilometres
100

Sumbay and those seen in northern Chile, so I am happy to use the name ignescens for both of them.
.....from F.Kummel

In 1994 I came across some T.glomeratus near the road from El Tatio to Calama at an altitude of 3400m. The spines on these plants were somewhat flattened, which is for me a good recognisable characteristic for this species. These plants were smaller in clump size than those of camachoi and ignescens which I had observed in this part of northern Chile.
.....from H.Sonnermo

The T.glomeratus which we saw carried much longer spines, but the most significant difference between them and both ignescens and camachoi was the body size - much larger on both of them than on glomeratus.
.....from H.Middleditch

Could these observations on relative clump sizes be related to the same species noted (above) by R.Moreton as consisting of "clumps only about a foot high"?
.....from F.Kummel.

The smaller of the two clumps on the picture on the inside front cover of Chileans No.60 could possibly be Maihueniopsis glomerata.
.....from F.Ritter, Kakteen in Südamerica 2.

Backeberg placed T.hypogaea under the name of T.glomeratus (Haw). The 1830 description by Haworth appears to be reliable, however, the author must have had another plant in mind. Firstly it must be pointed out that the cacti from the highlands of Salta, Jujuy and the south of Bolivia were still completely unknown in 1830. Even the most typical plant of the high Andes, the Trichocereus pasacana, was first described in 1886. Others, such as Lobivia, Rebutia and Parodia from there were not known until our century. On the contrary, again from 1830, northern Chile began to be opened up for cacti. Amongst others there was the description by Haworth which passes quite well, or even better, for the "Opuntia camachoi" Espinosa from northern Chile. This species also has flattened spines, and also frequently has only one spine per areole. The spine length of 5cm quoted by Haworth agrees very well with the spines on camachoi but poorly with hypogaea - their mostly shorter spines - especially when one considers that Haworth described a specimen cultivated in England, which would have had a still shorter spination than one would normally meet with in nature.

The flowers, fruit and seed of glomeratus were unknown to Haworth, but even knowledge of them is essential for a more certain determination of Maihueniopsis and Tephrocactus species.
.....from H.Middleditch

The comment from Ritter that "camachoi also has flattened spines" does not seem to be supported by any others who have viewed these plants in habitat, although bearing in mind the degree of variation that appears to exist within the Tephrocacti found around San Pedro de Atacama, this may well occur at some locations.

On a close-up photograph received from U.Eggli which was taken near Paso Sico, looking down at a plant of T.glomeratus, the spines are spread well outwards, so that their tapering, flattened, nature is very clear indeed. This does appear to be a feature commonly met with on this species. There is also a picture taken at the same habitat, of a bunch of half a dozen segments looking like fingers on a hand, which are laid on the ground beside a card marked off in cms, so that the length of the segments can be measured fairly accurately as only 2.5cm long.

Another specimen of T.glomeratus was photographed by U.Eggli between El Tatio and Caspana, again accompanied by a measuring card. Fortunately there are one or two segments disposed horizontally so that they can be measured as being about 4cm in length. Taken together, these measurements fit in with the "segments 2-4(5) cm long" as quoted by J.Iliffe (p.198, "Opuntioideae" Hunt & Taylor 2002). Once again, this raises the question as to what significance can be attached to segment size when considering the identification of this group of Tephrocactus to be seen in the area around San Pedro de Atacama.
.....from Herbarium record, Zurich City Succulent Collection.

Opuntia glomeratus E & L 2715, S.E. of San Pedro de Atacama towards Paso Sico = 31km S.E. of Tocanao. On gravelly gentle slope with some larger rocks, dominated by several shrubs and O.camachoi, at 3750m. Locally common, forming flat to slightly bulging cushions, spines mostly spreading, variable in colour, fruits when ripe exserted from cushions, pale bright yellowish (changing to rosy red when starting to dry up) and juicy. Appears to favour level sandy sites. Lowermost plants seen at 3500m, uppermost plants seen at 3950m.

Opuntia glomerata E & L 2716, S.E. of San Pedro de Atacama towards Paso Sico = 33 km S.E. of Tocanao. Gravelly gentle slope dominated by open shrub cover at 3680m. Very common here and more variable than lower down; segments sometimes long elongate and tapering, spines spreading or ascending, whitish, yellowish, brownish, red, or almost black.
.....from E. & N.Sarnes

We observed that segments of both Cumulopuntia as well as Maihueniopsis differ largely on one and the same plant depending upon which part of the clump you take it from. The new segments at the top are much thicker and more spiny than those nearer the soil. They differ also in their form. So we find it impossible to make a clear distinction without knowing the whole plant and where the segments were taken from.
.....from K.Gilmer.

From a distance most of the plants of T.glomeratus that we saw in Argentina looked rather - or even very - similar, with the same habit and merely a few differences in the spination. But on taking a close look there was a surprising degree of difference in the segment size and spination between plants growing within a few metres of each other.
.....from R.Ferryman

On the camachoi seen between Calama and San Pedro, the segment length is variable according to where

El Tatio

Tephrocactus ignescens

Photo: P. Hoxey

Puritama

Photos: C.Sherrah

Parinacota

the segment is taken and the condition of the plant - from the same clump, a variation in segment length was found from 2.5 to 4.5cm long.
.....from P.Hoxey.

There is indeed an appreciable variation in the spination to be seen on the clumps of Tephrocactus around San Pedro, which does not appear to be related to different species. I believe that the spine length is probably dependant upon the aridity of the area, so that drier places have plants with longer spines. Thus in a very dry habitat to the south of San Pedro de Atacama, at Peine at 2510m altitude, we came across plants with a very dense spination and extremely long spines. We were able to detach one segment and lay it on the ground next to a ruler which tells us that this spine is 12cm long, and that was no exception.
.....from H.Middleditch.

At lower levels of altitude near Calama and in the more or less immediate surroundings of San Pedro, which are desert like in appearance, no cacti appear to grow, probably because there is inadequate moisture to allow them to survive. Hence the plants seen near Peine at 2510m altitude have a long and dense spination, presumably to reflect or deflect the rays of the sun in order to minimise the amount of heat from the sun which can fall on the body of the plant, and thus extract moisture. By comparison, there will be a better chance of moisture being brought by rain bearing winds from the Atlantic Ocean to the plants seen west of Toconce at 3130m altitude. Hence it seems to be quite probable that variation in spine length and density may, to some degree, be a reaction to the availability of moisture, quite independent of the species.
.....from P.Hoxey.

We did indeed see plants well north of San Pedro, to the west of Toconce at 3130m altitude, with far fewer and shorter spines than those seen at Peine, but to the N. of Toconce at 3370m altitude, we did see plants with distinctly longer spines but with about the same number of spines to each segment as those seen to the W. of Toconce.
.....from H.Middleditch.

The foregoing observations regarding variation in segment size and form and also in spine form, attitude, and colour on these Tephrocactus from around San Pedro de Atacama, might suggest that these particular features are not sufficiently distinct between the species involved to enable them to be used for species determination. Whilst the flattened, tapering central spines do seem to be associated with T.glomeratus, this would not appear to be an entirely consistent characteristic. There are also observations on variations in flower colour and stigma colour which do not appear to be entirely consistent for any one of these species. Hence, apart from the decidedly low-growing form of T.conoideus, what feature can be used to separate camachoi, glomeratus and ignescens?
.....from R.Ferryman.

We did find some fruit on the plants with red flowers that we saw on the Cuesta Diablo. The fruit was elongated, over 5cm long, with fine spines clustered only round the apex and usually standing upright, with no obvious sign of areoles on the rest of the body of the fruit.
.....from P.Hoxey.

On the Cumulopuntia ignescens seen near Sumbay, Peru, I only found immature fruit which were still green and small. However, areoles and upright spines were only found around the rim. But near the Colca canyon we did find plants with ripe fruits, which ripen to a yellow colour and then become detached from the plant and yet held within the spines. When they are mature the fruit are a yellowy-green colour but still full of moisture with a quite a thick and juicy wall, which thins to almost paper thickness when dried out, the seed cavity also becoming dry without any juice. The seeds have a very pronounced ring around the centre which is very clear to see.
.....from C.Sherrah

In the very north of Chile, near Parinacota, at 4555m altitude, we came across some T.ignescens with ripe fruit. Some of them were still green with areoles and spines only at the very top, the reddish-brown spines standing almost straight upwards which were almost as long as the body of the fruit. The fully ripened fruit were pale brown and completely dried out with the seed enclosed in a dry cavity whilst the top third or so of the fruit was an open-topped cavity. Similar fruit was seen on the plants which we found growing along the road from Tocanao to Socaire, south of San Pedro de Atacama.
.....from H.Middleditch.

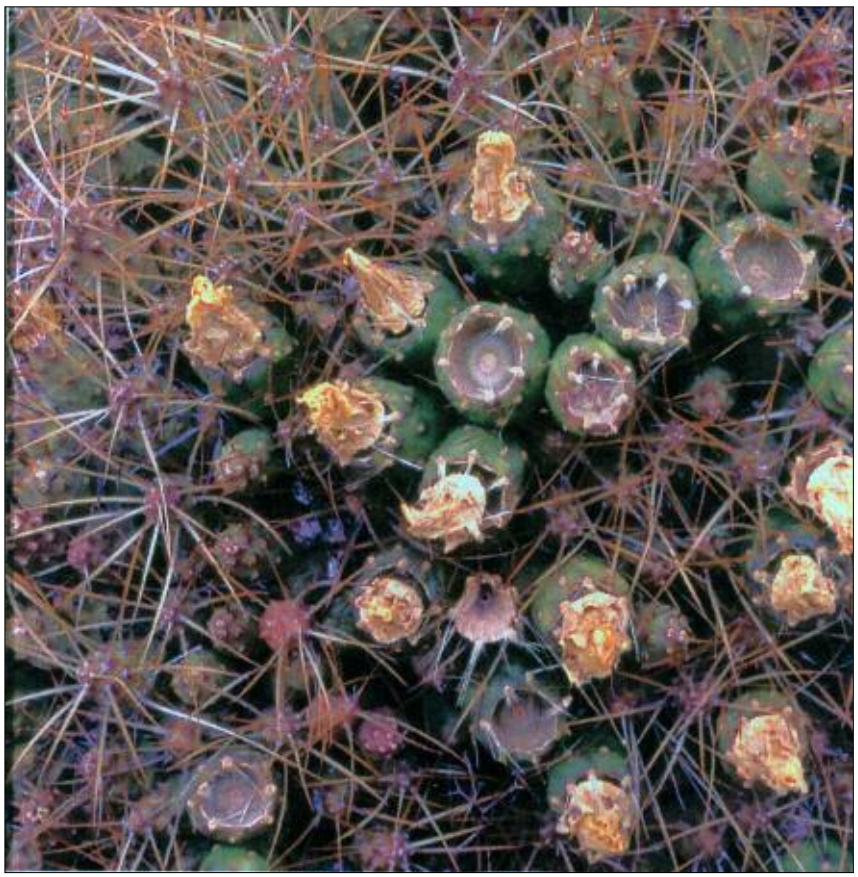
The pictures of the fruit which came with these observations basically match the fruit of Opuntia ignescens in Fig.43 of the article by J.Iliffe in “Opuntioideae” Hunt and Taylor 2002. Can this fruit be clearly distinguished from the fruit to be seen on T.camachoi or on T.glomeratus?
.....from R.Ferryman

The fruit which was found on the T.camachoi. between Calama and San Pedro de Atacama, was almost globular in shape, with a more or less flat top with spines round the edge of the flat top, which point in all directions from vertically to outwards.
.....from P.Hoxey.

The fruit seen on T.camachoi had areoles not only round the rim but also further areoles lower down the fruit which just carried glochids.
.....from C.Sherrah.

Along the Calama to San Pedro de Atacama road we found fruit on the T.camachoi, which had detached themselves from the plants before wrinkling, but had remained entrapped in the spines. This fruit was basically of a U shape which ranged from 2 to 4cm tall with some areoles on the upper third. On the areoles at or very close to the top there were spines which pointed in all directions and were rather stronger than the spines we had seen on the fruit of T.ignescens.

Toconao to
Paso Sico
Photo: U. Eggli



West of Villavicencio
Prov. Mendoza
Photo: K.Gilmer

Tephrocactus glomeratus

.....from H.Middleditch

The photographs of the fruit on T.camachoi taken by R.Ferryman east of Calama, also near Vilama, and at Puritama, are U shaped, slightly taller than wide, with a few areoles here and there from the base to the top of the fruit. The spines on the areoles both at, and near to, the top of the fruit point upwards, outwards, or downwards. The fruit seen to the east of Calama has far less spines around the top, than the fruit photographed near Vilama. The fruit on the T.camachoi seen by F.Vandenbroeck near Chiu-Chiu, pictured on the front cover of Chileans No.59 is similar, but not exactly the same. A picture from U.Eggli, taken between Toconao and Talabre (S.E. of San Pedro de Atacama) includes three fruits taken off one plant of T.camachoi, each having areoles here and there, one fruit being almost devoid of spines at the crown, another with very few spines, and the third with spine numbers comparable to those on the pictures taken by R.Ferryman to the east of Calama. Evidently the spines to be seen round the top of the fruit on T.camachoi do not conform to a rigid count and attitude. However, on all these pictures of fruit on T.camachoi, the spines are clearly not as long as those on the available pictures of fruit from T.ignescens and they are are not all pointing upright.

.....from F.Ritter, Kakteen in Südamerika 3.

Maihueniopsis camachoi - fruit without spines but with many glochids

.....from H.Middleditch

This observation appears to be at variance with almost all the other available habitat pictures and observations on the fruit of camachoi. Which leaves the question, can the fruit on T.glomeratus be distinguished from the fruit on T.camachoi and T.ignescens?

.....from F.Kummel

On 21 January 1966 we made a stop when we were travelling along the road from El Tatio to Calama to look at some clumps which we identified from the tapering, flattened spines, as glomeratus. Here we found two plants, each displaying a single fruit which were probably far from fully ripe as they were still crowned by the shrivelling flower petals. One of these fruits appeared to be quite spineless, but the other one carried some short spines around the upper margin. That does not match the fruit in the Fig.40 of J.Iliffe's article on the Andean Tephrocacti in Opuntioideae 2002.

.....from U.Eggli

In the course of our field trip to Chile we came across Maihueniopsis glomerata at a spot about 70km to the south-east of San Pedro de Atacama, towards Paso Sico, and again at about 40km from El Tatio, when going towards Caspana. This was an unusually dry year and much of the fruit that we saw on those plants was probably not developed to its usual full size.

But we did see one plant of glomeratus which displayed nearly a score of fairly ripe fruits which appeared to be fully developed although about half of them still carried the dried flower remains. All these fruit were of a barrel shape, tapering a little more towards the crown, but they were not absolutely identical to one another, although all very similar. They had an aperture at the top of about half the maximum diameter of the fruit. There were a few spineless areoles to be seen well spaced over the fruit and a few short, bristle like spines at the edge of the aperture at the top of the fruit. From the specimens of fruit held in the herbarium here, I would consider them to be about 3.5cm long. However, I would regard the size and shape of the fruit as of very little diagnostic value.

We also saw M.glomeratus in Catamarca (Dept. Calingasta, Iglesia), Mendoza (Dept. Las Heras), Jujuy (Dept. Humahuaca, Yavi, Tumbaya, and Susques) and Salta (Dept. Los Andes).

.....from K.Gilmer

In the course of our first visit to Argentina we left Mendoza and went via Villavicencio to the inter-andean valley which runs north from Uspallata to Calingasta. Both when travelling west from Villavicencio and when going north from Uspallata we stopped on several occasions and came across a considerable number of plants of T.glomeratus, of which many were in fruit. The ripe fruit was a pale yellowish colour, barrel shaped, about 4cm tall and about 2cm in diameter at half-height. Some of these fruit had some short, slender spines around the very top of the fruit and even on one and the same plant, other fruit was lacking in these spines. It appeared that these spines stood upright during the ripening of the fruit and then a few days before being fully ripe, these spines leant over the top of the fruit, either in wig-wam form or facing straight across the top of the fruit. .

.....from H.Middleditch

The photographed plant seen by U.Eggli between Calama and El Tatio is apparently quite small in size but displays about a dozen fruits, possibly mature in size. This picture was taken looking downwards at the plant, but the fruit does appear to be longer than the segments. The fruits on T.glomeratus seen by K.Gilmer in Argentina appear to be more or less identical to those seen by U.Eggli to the south of San Pedro de Atacama. Fruit of a similar appearance may be seen on the pictures on p.107 of Chileans No.60.

By comparison, the photographs on p.181 of the Iliffe article in Opuntioideae 2002 is rather puzzling as the Fig.28 does look like the fruit from T.ignescens, which would appear to fit the title of this picture as Opuntia bolivianus, but the fruit in Fig.27 is virtually an image of the fruit on the habitat photographs of T.glomeratus taken by U.Eggli and by K.Gilmer. Is this a mistaken identification by J.Iliffe? Incidentally, I see no sign of the "short spines" at the crown of the fruit in this picture, which are mentioned by K. Gilmer, by F.Kummel and by U.Eggli

.....from P.Hoxey.

But if you would care to look closely at the Iliffe Fig.27 fruit, you will see that it does have some short, bristle like spines projecting more or less radially inwards from the rim, across the open aperture at the top of the fruit.

.....from H.Middleditch

Following receipt of this comment I made use of a hand lens and indeed there are fine spines to be seen across the aperture at the top of the fruit in that picture. So I also looked at the picture of the E & L 2716 glomeratus received from U.Eggli and there is one fruit, externally spineless, of an appearance virtually identical to that of the Iliffe Fig.27, where the same short, bristle like spines are to be seen lying radially across the top of the fruit.

.....from K.Gilmer

I am sending you three fruits taken off my T. glomeratus growing in the greenhouse which were raised from material collected at TG 63 near Uspallata in Mendoza province or at TG 68 near Tocota in San Juan province. You will see that they are not all identical in shape and in the number of very fine spines standing upright at the rim. I also have a photograph of a glomeratus carrying fruit which was seen near Villa Vicencio, to the north of Mendoza city, which have a bunch of fine, short glochids and a few longer, slender spines. at each areole round the rim of the fruit.

.....from H.Middleditch'

These three fruits are certainly not identical in shape but they are fairly similar, being rather like those pictured at E & L 2716 and in Iliffe Fig.27. The fine upright spines at the rim are very similar in appearance and 15mm length on all three fruits. They are indeed quite different from the fruit on T.ignescens or T.camachoi.

.....from R.K.Hughes

As I have harvested the one fruit produced on my glomerata in April of 2008 it would have been set in the previous year. It was similar to the fruit in the TG 60 picture. When removing fruit from a plant of Maihueniopsis one has to be very careful, whether the fruit is green and turgid or has dried out and become rather woody. That is because around the floral scar of the fruit there are a ring of areoles that support a number of glochids. The central glochids in each of thse areoles are often up to an inch or more in length. They very readily get embedded in ones skin. They may look like spines due to their length but spines do not release so easily from the fruit.

.....from R.Moreton

I see that in the New Cactus Lexicon they have made M.camachoi and M.atacamensis synonyms of glomeratus. I must say that I find this rather surprising.

.....from H.Middleditch

In view of the distinct differences between the fruit on camachoi and on glomeratus, it would appear that this New Cactus Lexicon view is mistaken.

.....from R.Ferryman

But I would certainly agree that T.camachoi is synonymous with Opuntia atacamensis Phillipi 1860. I have visited all the Ritter sites of T.atacamensis and also those of Philippi to enable me to confirm that they are indeed all camachoi.

.....from H.Middleditch.

In conclusion it would appear that the various comments above suggest that it is almost impossible to use only segment and spine features to distinguish between the species of Tephrocactus seen in the area around San Pedro de Atacama, and whilst flower colours would appear to be of some value for this purpose, it now appears to be possible to use the fruit as a reliable means of separating out each of these three species in that area, despite all the recorded comments which seem to be at odds with the consensus of habitat observations.

.....from F.Kummel

The nomenclature of these South American Tephrocactus species is very complicated! There is still a need to pursue a thorough investigation in habitat in order to achieve some clarity in the future. Unfortunately in the course of a single field trip there is usually inadequate time to undertake detailed studies and also generally none of these plants are to be found with flowers, fruit, or even ripe seed, at one and the same time.

.....from H.Sonnermo.

My trip to Chile was in October when we saw quite a number of flowers on these plants but I do not have any note of seeing any fruit on them.

.....from R.M.Ferryman.

There are occasional flowers to be seen on these clumps of Tephrocactus at almost any time of the year, but the peak flowering tends to be in Spring, as on the trip made to this area in November. It was on the visit made at the New Year of 2002 that we found fresh fruit on many of these plants, but there is almost always fruit present on some of the clumps which is probably the previous year's fruit which has been trapped in the spines.

.....from C.Sherrah

My visit to the area around San Pedro de Atacama was made at the very end of November in 2001, when a lot of flowers were to be seen on many of the clumps of Tephrocactus, but we also found fresh fruit on quite a few of them.

.....from A.Delladio.

We travelled to Chile in January, approaching San Pedro from the direction of Socaire, crossing some quite rocky ground with some very sparse clumps of grass and very scattered clumping Tephrocactus. We stopped to take a picture of an isolated Trichocereus pasacana and close to it there was a single flower to be seen on one of the Tephrocactus. On the following day we went from San Pedro to El Tatio but we did not see any flowers, nor any fruits, on the Tephrocacti there.

.....from P.Hoxey.

Looking at the Iliffe article in the 2002 "Opuntioideae", there are differences to be seen between the fruit

depicted in the Fig.27 and Fig.28. The Figure 28 is certainly a fruit of the bolivianus complex, (with which ignescens is closely associated - or regarded as a variety) which is in accordance with the title to that illustration. It is quite a good match for the fruit which I have seen on ignescens both in southern Peru and in northern Chile. On the other hand, the Fig.27 does look different, largely on account of the lack of readily visible spines and it is much closer to the fruit in Ilife's Fig.40 which is of T.glomeratus.
.....from H.Middleditch.

As observed by F.Kummel, it would appear to be difficult to observe all the desirable features of the segments, spination, flowers, and fruit of the Tephrocactus from the area around San Pedro de Atacama in the course of a typical visit of a few days to this area. Fortunately, the observations recorded above for visits made at various times in the seasons of both flowers and of fruit would appear to offer a good overall appreciation of all these features.

As is not unusual, some authors - such as Iliffe - lump these plants under the title of Opuntia, whilst others place them under Cumulopuntia or Maihueniopsis, which is largely a distinction between the appearance of the seeds of these groups. If a similar approach were adopted with some other cacti, then for example, the Microsperma group would be separated from the rest of the Parodia, and given a different generic name. Similarly, the Muscoseminae group of Gymnocalycium would be removed from that genus - both on the basis of seed and plant appearance - and given a new generic name. On the other hand, Backeberg - renowned for splitting genera - placed the plants of the Maihueniopsis and Cumulopuntia seed groups under the one name of Tephrocactus. In view of their vegetative similarity, this is understandable as Backeberg's writings give the impression that he was writing for cactus growers who were interested in growing and discussing their plants, for whom a name was expected to give a lead to the form of the plant in question.

There is, of course, value in using these names to distinguish the seed groups - as is done in Parodia and in Gymnocalycium, but there does not appear to be any value in using Maihueniopsis and Cumulopuntia as generic names.

FINDING THELOCEPHALA IN HABITAT From R.Ferryman

On its way south from Taltal, the Pan-American Highway comes into the Quebrada Cachina, following it in the direction of the coast for a km or two, before it turns south again. At this point there is a track which leaves this valley but which continues down the Quebrada Cachina, along a valley with floor and sides that are virtually devoid of any vegetation.

But quite soon, spots of green vegetation appear on the slopes at either side of the road. By the time this road is passing Mina Esmeralda, lying well up on the hillside to the north, the hillsides are carrying hundreds of bushes, which are rarely taller than waist height, sometimes standing close together, mostly several arms-lengths apart from each other. Occasionally a bush of head height can be seen. There are also tall columnar Trichocereus and Eulychnia which are mostly widely scattered, but here and there a few of these plants may grow barely a stone's throw or less from one another. Also growing on these slopes along with the bushes and the columnar cacti, there are a great number of Euphorbia shrubs, terrestrial Bromeliads, Tillandsias, and numerous other herbs and annuals, such as Nolana paradoxa, a small tuberous Oxalis and stinging type of Solanium. From a distance, whole hillsides can appear to be green, but not all are green.

All this Flora is supported by the moisture from the mists which come inland from the sea, so that it is not only on the slopes at either side of Quebrada Cachinal which have the advantage of this moisture and the consequent vegetation cover. The Quebrada Grande leading off to the south from Quebrada Cachinal, as well as all the hillsides along the numerous other side valleys, display this same vegetation cover. The mist also sweeps round the hills to the north of Quebrada Cachinal, so that their slopes also have a covering of bushes, columnar cacti, and herbs.

But this vegetation, although widespread inland of Planta Esmeralda, does not cover the whole of the area as far as the upper limit of the mist zone. There are patches of ground, some small, some larger, where the vegetation is quite sparse indeed, or confined to very low growing plants - mainly on slopes which face inland, that is, eastwards. At other places, where the mist tends to collect in local hollows, there is an abundance of moisture in the air, so that there is an abundance of lichen or spanish moss growing on other plants and drooping from the bushes and the occasional tall Eulychnia or Trichocereus.

Different again are the valley bottoms, mostly quite flat, with a covering of quartz type sand and very little vegetation other than the cacti. Only very occasionally indeed will a tall Trichocereus or Eulychnia grow in this ground, and then usually where some rock outcrops on to the surface. Patches of similar flat, sandy areas also occur here and there in the hills. It is on these flat sandy areas, and only on such areas, where Copiapoa columna-alba is to be found. Copiapoa longistaminaea also grows there but it seems to favour the more undulating hills. Copiapoa cinarescens is a shoreline species that is to be found here and there from Pan de Azucar as far as to the north of Quebrada Cachinal. Neoporteria taltalensis inhabits rocks, slopes, and undulating ground from Pan de Azucar to Cifuncho, as well as inland to Breas.

Also growing along the shoreline north of Pan de Azucar and on the beach at Esmeralda is Thelocephala malleolata, displaying rather whiter wool than T.esmeraldana. But T.esmeraldana is to be found growing in various circumstances - on level sandy patches, in the hills, and on coastal slopes.

Thelocephala esmeraldana is one of the few Thelocephala that can be regarded as common in habitat, growing in a variety of terrain, in what is a wide distribution for Thelocephala but still within a fairly small area. It is very adaptable to beach, to quartz sand, to rocks, and to earthy terrain, either on flat ground or on sloping hillsides, so much so that it tends to get dismissed as one treks over the area. It is to be found on the

beach some two or three km to the north of Pan de Azucar, as well as on the beach from south of Esmeralda to north of Quebrada Tigrillo. Similarly it can be found in the hills around Esmeralda and Quebrada Guanillos up to 250 m altitude. There are indeed some minor differences of appearance throughout this distribution as one might expect from such a successful plant. But I did meet with a freely offsetting plant which is almost monstrose, in the coastal hills just to the north-east of Pan de Azucar.

In addition, there is a very interesting form of Thelocephala malleolata to be found growing on the beach near Esmeralda, that is the fairly wide area which slopes quite gradually from the foot of the coastal hills down to the edge of the sea. This is freely offsetting, the offsets not arising from the exterior of the body as they do on most cacti, but being attached to the main body of the plant by a very short, slender stolon, each individual offset having its own carrot like root similar to the main head. This is the form which I believe is Ritter's "Type" and the more frequently encountered solitary form is what Ritter apparently called "var. solitaria".

Whilst both species of Thelocephala viz: malleolata and esmeraldana, overlap in terms of location and altitude, they do not appear to me to be the same species. Thelocephala malleolata generally prefers the flatter areas and also seems to be limited in its altitude distributiom in that it does not appear to inhabit the hills and the coastal slopes. On the other hand, Thelocephala esmeraldana does not seem to be the least fussy about its location.

.....from W.Maechler

When our family were in Esmeralda and the surrounding area, we found various forms of Thelocephala esmeraldana. These plants grew both at WM 014a at an altitude of 240m immediately to the north of Esmeralda, and then also at WM 014 to the east of Esmeralda where these Thelocephala grew in company with Copiapoa columna-alba. At both these places, the T.esmeraldana which we found produced offsets which were attached to the main body of the parent plant by nothing more than a single slender root; each of the offsets formed a miniature plant, each with its own carrot-like root. Eventually these offsets detach themselves from the main plant so that they then form a clump of individual plants. Then more to the north of Esmeralda we found plants which had thick, carrot-like roots, similar to those on Th. weisseri.

.....from A.W.Craig

Travelling to Chile in 1994 as one of a party of five, we had two great advantages when it came to finding Thelocephala. Firstly a considerable amount of data accumulated beforehand from various sources regarding places where it was worthwhile to search for these plants, and secondly that there were several pair of eyes scanning the ground. We saw some Thelocephala in the Huasco valley and then again a few days later we saw more Thelocephala to the west of Totoral. Finally we found Theocephala esmeraldana both near Planta Esmeralda, which lies some three km from the sea, then down on the beach itself, as well as a couple of km inland from Planta Esmeralda. In the course of our visits to Chile in 1996 and 1997 we found more examples of T.esmeraldana, both in the Quebrada Cachina and in Quebrada Guanillos.

At places a few km inland on higher ridges in rocky or slatey crests, the plants we found had a chocolate brown coloured epidermis and were sparsely spined, with spines 1 to 3mm in length. These plants were almost always solitary and corresponded to plants of RMF 165 and FK 506. About 8 km inland, on the lower slopes of the Cerro Negro, we came across similar but spineless plants which resemble the Neochilenia occulta RMF 68. The plants we found in the Qu.Guanillos were of a similar colour but the spines were about 10mm long and curved. Then on gravelly hills at about one km to the east of Esmeralda, we again found a dark chocolate brown Thelocephala esmeraldana but here there were plants offsetting freely from the lower areoles and of course with only the single taproot.

Below the dry waterfall which barred our progress downstream in 1995, the beach slopes gently down to the sea over a distance of a kilometre or more. Here on the beach we found a population of Thelocephala esmeraldana with sandy brown coloured bodies which produced numerous offsets, but each offset put down its own individual taproot, rather similar to T.kraussii. This is a feature of Thelocephala esmeraldana which I had neither seen nor heard of prior to finding these plants on the beach.

.....from R.Hillmann

After travelling about 17 km from Copiapo in the direction of the coast, it is possible to turn left off the main road and take the dirt road which leads to Punta Viejo. Alongside this road we found plants which were quite different to the usual Thelocephala. In the sandy soil there were big clusters of heads, with individual heads up to 6 cm across and clusters of up to 20 cm across. Here there were unripe fruits but no flowers. I do not think that these were originally single headed plants which have had the top eaten off by Guanacos, but I did not unearth any plant to check if each head had its own root, or was an offset from the main head. I would think that these plants are Thelocephala kraussii.

.....from R.Ferryman

Most of the Thelocephala species that are normally solitary, appear as clumps due to damage of the original head. Ritter talks about damage by Guanaco and I have seen this close up. Of the true offsetting types, these are generally clusters of small heads around the main head whereas damaged plants have heads quite random around the damaged head.

.....from G.Charles

There are many habitat locatons in Chile where Thelocephala may be found growing and I have probably seen clumping forms of most of these various species. It is hardly surprising that they will form clumps as they are very probably eaten by the Guanaco, which is a protected species and now quite numerous. If one sees scrapes or hoof marks in the sandy ground, next to a Thelocephala, that is a fairly good indication that the Guanaco have been looking for these plants in order to find something to eat.

There can be more than one dry year in turn in the parts of Chile where many of these plants grow, when

the rainfall is virtually non-existent and in these conditions it could be very difficult for the guanaco to find any food. But, under those conditions most of the Thelocephala will have received little or no moisture on which to survive and grow, so they will have sunk down into the ground, even below ground level, But when any Thelocephala has been eaten by a guanaco it will produce a clump of new heads from the underground swollen root, heads which are all more or less the same size - whereas when a Thelocephala offsets naturally it will have one large head with smaller heads around it, such as the T.odieri which we saw to the south of Caldera.

Most of the Thelocephala which we saw were growing on ground which was almost level, on wide flat areas or the flat top of hillocks, or on very gentle slopes. Also, most of them were to be found in sandy, gritty, or gravelly ground which evidently allowed them to retract into the ground in dry conditions.

In the Guanillos valley we found T.esmeraldana growing almost on the beach. possibly even within 100 metres of the sea. Elsewhere we often found Thelocephala growing within sight of the sea and almost all the Thelocephala that we saw grew within about 2km of the coast. It was only T.esmeraldana that we saw growing among rocks, and that was not a great distance inland from the sea, along the Guanillos valley, but we saw no other species growing in rocks anywhere else.

It is only in an El Niño year that one can expect to see Thelocephala in flower in habitat. On our 1994 trip to Chile it was not an El Niño year and although we did see Thelocephala at six diferent places between Freirina and Guanillos, there was not a single plant to be seen in flower. Even in an El Niño year it does not necessarily rain at every single spot where Thelocephala grow so there are only flowers to be seen where the rains do fall. Hence on our 2004 trip to Chile - an El Niño year - we only saw T.odieri and T. malleolata in flower as the rains had only fallen generously up to about as far north as Copiapo but with sparser rainfall a little further to the north up to about Chañaral. At Playa Blanca, near Chañaral, we came across a Thelocephala malleolata with the body still below ground level but with the flower in the open air. It is quite likely that there would be other places where the Thelocephala were in flower, at spots where our route and stops did not take us.

At many of the places where cacti grew and the rains had fallen we could see abundant green vegetation, growing even taller than the columnar Copiapoas and almost hiding them from view. In other years such green vegetation would be almost completely absent.

.....from R.Stanik

I have seen Thelocephala growing between Huasco Bajo and Carrizal where there are many places with T. duripulpa or T.aerocarpa that are very close to the ocean. In regard to these plants growing further than 2km inland from the sea, there are certainly many places near Freirina with Thelocephala, and that spot is more than 2km inland. Near Canto de Agua, on the turnoff to Carrizal Alto, there are T.odieri growing at about 30 to 40 km from the coast and at a similar distance there are T.lembckei on the road from Maitencillo to Mina Algarobo.

.....from R.Ferryman

The northern populations of Thelocephala are certainly coastal in whereabouts they can be found growing, but even there T.esmeraldana has a distribution which takes it away from the coast, possibly as far as 20km inland. Some of the original Lembcke discoveries of Thelocephala, which were published by Backeberg, are well inland even to beyond Vallenar. Similarly there are locations to the north of Trapiche where T.fankhauseri can be found and further still to the north T.tenebrica grows not far from the Pan-Am. There are also T.aerocarpa to be seen at Canto del Agua which must be about 30km from the sea. The southernmost populations are those that can be found away from the coast.

Thelocephala certainly enjoy the benefit of El Niño but in my experience it would not be correct to suggest that they flower only after such an event. What one can say is that there are more flowers and fruit after El Niño but I have captured a number of pictures of Thelocephala flowering in a year when there has not been an El Niño. One must remember that rains do occur outside of El Niño and a number of species of Thelocephala survive quite well from the coastal mists. Thelocephala esmeraldana and malleolata for example have been seen in flower during my trips to Chile in dry Springs. My photograph of T.krausii in flower in Kattermann's "Eriosyce" (attributed to A.Hoffmann) was taken during a dry Spring in August.

There are other species which do not enjoy regular misting - my friend at Bahia Iglesia always tells me that the populations of odieri on the Morro Copiapoa have gone many years without flowering. This is evident as the plants pull themselves deep into the ground. In 2004 it was a wet Spring and most of this population were in growth and flower. I can remember the Americans (from the CSSA) suggesting that this odieri population was erupting from the soil.

During the trip I made to Chile in February of 2008 it had been a dry year, as had the previous year. Nevertheless we found all species, including those recently described populations. We did not find flowers, but then I would not expect to in February. At two locations we did find the plants described as new species by H.Walter in the A.Hoffmann book on the Cactus of Chile. But I do not believe that they are new species, simply extensions to existing populations. One of these was found inland from Carrizal, close to T.aerocarpa, but in a distribution line connected to T.lembckei.

However in the course of our searches during that trip we did make a discovery that I believe could be regarded as a new species, growing between Morro Copiapo and Totoral in a coastal area near Puerto Viejo. It is part of the T.odieri complex - it is smaller and freely caespitose, somewhat like T.krausii but not with similar sized heads. It is abundant in a very small area, to be found growing with Copiapoa marginata or C.bridgesii - the most southerly point at which I have found these two species of Copiapoa growing.

.....from A.Glen

In my experience, Thelocephalas are, in the main, solitary but there are a few exceptions. I have had the

occasional offset on T.napina - appearing at the top of the plant and eventually getting down to soil level as the plant grew on. I used to have a clump of T.krausii. The major exception, however, is T.esmeraldana, some forms of which are highly caespitose. About 15 years ago I remember seeing clumps of this species in cultivation. I suppose there are still some around. The examples most frequently seen nowadays are FK 795. Other T.esmeraldana such as TJ70 and FK 506 seem to remain solitary.
.....from J.Cooke

I am fortunate enough to have two plants of Thelocephala esmeraldana. One of these is RMF 165, from "Esmeralda beach", obtained at a Chileans' Weekend. The body is solitary, only about one inch across. It is a very dark brownish green and very tuberculate. Each tubercle is diamond shaped, about 4mm across and 2-3mm high. The areoles are minute, with the occasional blackish spine. The other plant came from D.Aubrey-Jones as FK 795 "aff. esmeraldana". This plant has a more rounded body and is almost blackish in colour. The areoles are prominently white, lozenge shaped about 1mm across and 3mm long. The spines are pale ginger in colour 1-2mm long, pressed to the body, It is presently offsetting. But I can confirm that the offsets are putting down their own miniature tap roots.
.....from H.Middleditch

Where the offsets that form on Thelocephala are connected to the body by a short stolon, it may be appropriate to describe this form of growth as stoloniferous offsetting. If there has been a previous reference in the literature to this type of growth on Thelocephala, then it has escaped my notice.

FLOWERING TRICHOCEREUS SPACHIANUS? From R.Purves.

It will be at least twenty years ago that I acquired a quite small plant of a Trichocereus which may not even have had a name at that time. It certainly has not been given a name in recent years, when it has continued to grow into a nice columnar plant, which is now some 140cm tall and 6.5 cm in thickness, with 14 vertical ribs which are about 6mm deep and quite blunt. The 8-10 radial spines are about 9mm long, of a fairly pale creamy-brown colour and whilst none of these radial spines overlap those from areoles on the adjacent ribs, at many areoles the lowermost radial spines just overlap the wool on the next areole below, on each rib. The central spines are very slender indeed - not really different in that respect from the radial spines - about 14mm long, reddish brown when new at and near the crown and shoulders, becoming paler brown with age. The overall impression is of a very smart green looking stem without eye-catching spination.

Some two years ago, a pair of buds appeared at opposite sides of the crown, initially totally enveloped in long woolly black hairs, to be followed in the course of a few days by the exterior of the almost equally black outermost petals which were growing up from within the black hairs. After these two buds had grown to about two inches in length, then in the course of just a few days they turned themselves to face completely sideways. Then during the following week they grew steadily longer, the dark outermost petals starting to part to expose the white inner petals.

One morning the flowers were found to be open, still facing sideways, the flower tube adopting a very slight "S" shape in side view. The flower opening, of about 16cm across, faced very slightly downwards. The stamens extended not quite half way up the inner petals, the very long style carrying the stigma out so far that it extended a short way beyond the actual flower opening.

One year later, this plant again flowered, now with five flowers all at the shoulder of the stem. On this occasion, two of the flowers adopted a horizontal attitude from the bud stage, but the other three flowers were inclined upwards at approximately 30° to the horizontal, all with flower tubes which again were ever so slightly not quite straight. A pair of new offsets from the base of this plant, which first appeared some six or seven years ago, have now both reached a height of some 70cm.

A second plant, of very similar overall appearence, likewise without an identity beyond being a Trichocereus, is now 130cm tall and 9cm in diameter, with 18 ribs which are more sharply defined - the base of the intercostal groove giving the impression of being quite well defined by a slightly darker green line. This year it produced a magnificent display of six flowers, all open at the same time and inclined half-upwards at about 30° to the horizontal. But on this plant the flowers have a brownish-pink coloured exterior to the flower petals.

All these flowers usually stop open for two full days.
.....from D.W.Whiteley

The pictures of the plant grown by R.Purves look like the Trichocereus spachianus that I know. The plant I have which originated from the collection of F.Wass, which he would have obtained round about the 1950's or 1960's, probably from Churchman's nursery at Mansfield.
.....from R.Mottram

My own plant of T.spachianus came from Blackburn's nursery in the mid 1960's. When the stems reach about 30cm in height they are mature enough to flower, the flowers appearing in clusters of 1-3 very near to the top of the stem, on the side facing the sun. They open in the evening and remain open the following day. They are self-compatable, but because the style is exserted well beyond the anthers, it is usually necessary to artificially transfer the pollen to the stigma lobes in order to set fruit. Soon after the ripe fruit splits, it falls to the ground. The seeds remain embedded in the white pulp, and are probably dispersed by ants or birds.

The stems can grow up to about 2m high by 6.0 to 6.5cm in diameter, with thirteen ribs of a bright green colour. The areoles are about 3mm in diameter, white wool-felted, with ca. 8-11 radial spines, unequal, the longest the lowermost up to ca. 1cm long. Centrals 1, more or less porrect, up to 1.7cm long. All spines yellowish brown with darker base, slowly becoming greyish, straight, acicular.

Trichocereus spachianus

Photos & collection: R. Purves

.....from W.Clarke

I do have a Trichocereus raised from seed which is of similar appearance to my DJF 295 T.shaferi; it is now almost two feet in height and it has also flowered. The flower buds arise from the crown, close to the shoulder, and stand at a small angle to the vertical, with the tube clothed in black hairs. When the first signs of whitish petal colour appear between the dark brown sepals, the whole bud turns to adopt an almost horizontal attitude and when the flower does open, it faces sideways.

.....from J.Lambert.

I have a cultivated strain of T.spachianus, much used for grafting. On this plant the flower buds started off vertically from the shoulder of the stem, but well before the flower opened, they turned to adopt a horizontal attitude so that the flower opening did face almost directly sideways. I was able to take photographs looking sideways at the flower - the flower tube is not dead straight but adopts the shape of a very slightly sinuous curve, rather like a letter S on its side.

On a visit to Argentina I was following the road which starts off from Buenos Aires and in due course enters the very SE corner of the province of Santiago del Estero, when there was still about 170km in front of us before we would arrive at the city of Santiago del Estero. A stop was made at Icano, where there was thick vegetation typical of this part of the Chaco at either side of the road, as there had already been for many kms. There were bushes of a good 2m in height together with some tall trees. The cactus most widespread in this region is undoubtedly Stetsonia coryne, which attains a height of between 5 to 8 metres and so made itself visible here and there above the bushes, as also did Cereus forbesii. This Chaco bush is so thick that one has to be careful not to get lost in it!

It was near Icano that my eye had been caught by a solitary cereiform stem growing close to the roadside, which I photographed. But I was not able to find any other representatives of this species in the immediate vicinity. So it does seem to be rather rare here. It displayed some 14 ribs with 7-10 spines at each areole, which were some 6-10mm in length (much finer and shorter than on Cereus forbesii). These spines did not cross those from areoles on the adjacent ribs (Fig. 238 of my book). There were a couple of small buds near the shoulder of this plant,

There was no sign of branching from the base and I eventually concluded that it would be Trichocereus spachianus. In my collection I have an un-named Trichocereus which I would consider to be a T.spachianus. It has flowered, the flowers standing out sideways from near the top of the stem, the flower tube not being quite straight.

.....from H.Middleditch.

The slide received from J.Lambert of his cultivated and un-provenanced Trichocereus, a presumed T.spachianus looking like the typical plant cultivated as T.spachianus in the U.K., displays a flower with a tube which adopts the slight “S” shape, more or less identical in that respect to the flower seen by R.Purves and by W.Clarke on their respective plants.

.....from D.W.Whiteley

The photograph entitled T.spachianus which J.Lambert includes in his book on the Cacti of Argentina, looks to me like a typical Echinopsis, as these do grow tall in habitat. On the picture taken by R.Purves of his Trichocereus spachianus, the flowers have black hair on the tube, whereas the Lambert photograph has a just discernible bud on the top with light white wool. I have seen habitat slides of similar columnar Echinopsis that look more like Cereus plants, even up to one meter or more in height, as I recall. Is this illustration properly named?

.....from J.Arnold

I feel quite sure that we would regard his cultivated plant in flower, captured on slide by J.Lambert, as typical of Trichocereus spachianus. The habitat picture of the supposed T.spachianus in the J.Lambert book does not look to me to be anything like the plant I know under that name. It is an open bodied plant with stronger and fewer spines. fewer ribs which are fairly sharp and quite deep - on spachianus they are blunt and and much less deep. In fact it looks more like an Echinopsis of E.leucantha affinity.

.....from R.Mottram

The photograph on p.289 of the Jaques Lambert book is certainly not T.spachianus. I would hazard a guess that this plant is an elderly example of Echinopsis rhodotricha.

.....from G.R.Allcock

The photograph provided by J.Lambert in his book of a plant growing near Icano, does not look to me at all like the T.spachianus widely encountered in cultivation as a hardy grafting stock.

.....from H.Middleditch

The four foregoing views were offered entirely independently of each other. It is quite possible that J.Lambert was influenced in naming the plants he saw near Icano as T.spachianus by the Kiesling 1978 Trichocereus en Argentina article in which the distribution of this species was stated to be “Santiago del Estero, Icano”

.....from F.Vandenbroeck

I was surprised that you found the locality of Icano on your map of Santiago del Estero. I was even more surprised to see that it lay on Ruta Nacional 34 which was the road that we travelled along going from Santiago del Estero to Mar Chiquita in Province Cordoba. So we must have passed the village of Icano without noticing it. The landscape in this part of Santiago del Estero province is a typical Chaco area. Large parts of it still display its natural vegetation, but large areas have been deforested and transformed into prairies for cattle raising. It is not an area where cacti abound, and if they occur amindst the vegetation, they can hardly be seen from the road. We did not see any Trichocereus in this area.

.....from U.Eggli

Trichocereus spachianus is a prickly subject. I guess that the spachianus used as grafting stock in England is the same plant that we have taken to represent this taxon for ages, and which conforms to the close up picture of the stem photographed by R.Mottram. My own experience with spachianus is confined to cultivated material. The only thing that I am sure about is that the picture in the Lambert "Cactus d'Argentine" book has nothing to do whatsoever with spachianus. Being from Santiago del Estero, it reminds me more of an oversized Echinopsis tubiflora. I am further inclined to think that the material currently identified as Trichocereus shaferi could be quite closely related with our cultivated T.spachianus.

.....from M.Muse

In Spring of this year I acquired a further tranche of seed from L.Bercht, among which were a number of collected Trichocereus seed, including "T.spachianus ZJ 86 Los Andes". I have not found this locality on any maps to hand, but presume it to be in Santiago del Estero. Does this mean that the premier name for plants from that locality would be T.santiaguensis speg.? Kiesling holds that T.santiaguensis Speg. is in fact synonymous with T.spachianus, but on the basis of available evidence this seems to be dubious.

I have the impression that the British Standard Trichocereus spachianus is widely distributed in collections and that everyone knows what it looks like. A photograph reproduced by G.Rowley in one of his books in the 1980's presumably shows a plant I have always been led to believe was the standard T,spachianus. But unfortunately I do not seem to have seen one of these plants, myself. Nevertheless, I do wonder what the original Cereus spachianus as described by Salm Dyck would correspond to in our collections today. And what are we to make of the Trichocereus spachianus (Lem) Ricc. that we have from Backeberg which might have been better stated as T.spachianus (SD) Britton & Rose? And what exactly are we to make of Cereus spachianus Lem.? Although I do not know what Lemaire's description of C.spachianus actually tells us, as I am not familiar with it.

.....from R.Moreton.

I have sifted through various seed catalogues and compiled an extract of the various ZJ numbers that I have found. This includes ZJ 87 Neoporteria curvispina from West of Los Andes, and ZJ 86 Trichocereus chilensis also from west of Los Andes.

.....from H.Middleditch

This would suggest that the Los Andes in question is the place of this name which lies on the Valparaiso to Mendoza railway line about two thirds of the way from the Pacific to the Chilean border. This would make a most interesting location for T.spachianus, but I would be more inclined to suggest an anomaly in the seed list.

The very first description of Cereus spachianus would appear to be that provided by Lemaire in Hort. Univ. I:p.225, 1840, according to Backeberg's Die Cactaceae. On the other hand, Kiesling's monograph on Trichocereus in Darwiniana Vol.21 1978 gives the first description of Cereus spachianus by Lemaire as from L'Horticulteur Universal I.225, 1839.

.....from G.J.Swales

It is very probable that both these references are concerned with precisely the same publication, which unfortunately I do not possess. However, in Labouret, Monographie de la Famille des Cactees 1853, pp.324-325, we are told that the original description by Lemaire is repeated, so a translation of that entry is appended.

.....from Labouret, Monographie de la Famille des Cactées 1853

Cereus spachianus (Lem) Diagnosis: Body erect, stout, bright green, branching from the base as it gets older, 12-14 rounded ribs, areoles small, close packed, round, with grey wool: spines pale yellow, fine, stiff, needle-pointed, straight; 10 marginal spines radiating outwards, those at the base appreciable longer, only one central, a little stouter. Body height 60-70 cm., about 8 cm in diameter, proliferating in maturity. This species differs from Cereus strigosus by the taller body, the areoles less closely packed, the outer spines fewer, and the isolated central spine. Flowers unknown.

[Observations on cultivation omitted]

This plant, already tolerably well established in European collections in past years, has been little reported in the collections in France, where more often it is confused, either with Cereus strigosus or its variety [not named - G.J.S.] or with Cereus flavescens. For that reason, it is perhaps useful to reproduce the description that Lemaire has given on p.225 of the first volume of Universal Horticulture:

> Plant body erect with a very dark green epidermis, slightly glaucous [=sea green, G.J.S.] in its upper part, with blunt ribs, almost mammillate; furrows moderately open; spines short and stiff, whitish.
>
> The body of the plant described is about 54 mm in diameter, ribs 9, of 1 cm height and of about the same size across the base, blunt, swollen in the region of the areoles which are borne on a kind of mammilla; areoles separated one from the other by about 2 cm., small, almost round, bearing a whitish down, short and soon lost; normally 6-8 spines, spreading at a fairly wide angle, sometimes arranged regularly, and in this case 6 radials of which the upper one is very weak, the others, as does the central one, reach a height of 10-13 mm, stiff, straight, slender, whitish, black at the tips.
>
> In Monville's collection, this plant was regarded as a variety of Cereus rigidispinus Monv., which is unknown to us and was described thus:
>
> Body sturdily erect, dark green, somewhat glaucous, having ribs that are thick and rounded, the furrows between open and sharp; spines extremely strong and rigid, whitish, radiating.
>
> Body 6 cm in diameter, with 7 ribs, 2 cm high by 1 cm wide; areoles 13-22 mm apart, somewhat sunken, slightly oval, a little convex, bearing a very short down, greyish in colour, with 6-8 very thick spines of unequal length, very strong, varying from 6 up to 27 mm in length.

.....from H.Middleditch

From Schumann's Gesamtbeschreibung der Kakteen we find that Lemaire lived in Belgium for a considerable length of time as Editor of the "Flora of the Greenhouses" and that he was one of the most productive authors on the subject of cacti. Evidently Monville had a very extensive cactus collection, possibly one of the largest and foremost of his time, which seems to have been much utilised by Lemaire for the purpose of writing articles for his periodical. Schumann also tells us that Monville was the owner of a large-scale factory in Normandy, but the whole of his wealth was lost in a hurricane, so that his very extensive plant collection was dispersed in 1845. We are left to assume, if we wish to, that the original Cereus spachianus was grown in the Monville collection.

However, we are faced with a description given by Labouret in 1853 (above) which appears to differ significantly from that given originally by Lemaire in 1840 (above). On the one hand, a bright green body with 12-14 ribs, on the other a dark green and somewhat glaucous body with nine ribs.

.....from M.Muse

I am not so sure that glaucous means sea green and I do wonder whether it can be interpreted as such. Glaucous as I understand it generally suggests a bluish bloom on a plant.

.....from R.B Ivimey-Cook, Glossary of Succulent Plant Terms

Glaucous - covered with a waxy bloom.

.....from G.J.Swales

The actual word used by Labouret in the original French is glauque, which my Harper's French dictionary gives as sea green. [And in my Cassell's French Dictionary - H.M.]. In Lindley's Introduction to Botany (my copy is 1848) there is a list of colours in which there is a section headed "Green" which includes an entry for "Sea green (glaucus); dull green, passing into greyish blue". It would probably be generally accepted that the botanical application of the term glaucous implies the existence of a waxy coating which results in the underlying surface having a bluish tinge, even though the underlying surface may lack any bluish tinge in the absence of the waxy coating.

.....from J.Lambert

The treatment of T.spachinaus by Kiesling in Darwiniana 21, 1978, mistakenly equates this plant to T.santiaguensis, following Britton & Rose, but the latter has a trunk of 4 to 7m tall, which effectively excludes T. spachianus.

.....from R.Mottram

It would be sometime about 1970 when Kiesling asked me for a sample of Trichocereus spachianus, which I supplied, together with a detailed description. At that time, he did not know this plant in the wild, at least in Argentina, and speculated that it was perhaps of Bolivian origin.

.....from H.Middleditch

If we care to consult Kiesling's 1978 monograph on Trichocereus we find that he places Cereus santiaguensis Speg. as a synonym under Cereus spachianus Lemaire. Kiesling then adopts the greater part of 1905 Spegazzini description of Cereus santiaguensis as his own description for Trichocereus spachianus. This involves a tree-like plant growing up to 4 to 7 metres in height with a 16-20 cm diameter trunk, with curved ascending branches. This does not appear to have a great deal of resemblance to the earliest descriptions of T.spachianus with stems around two inches thick and not quite a yard high. Hence it would appear that Kiesling is in error in this instance.

Going to Cereus spachianus in Förster-Rumpler's 1886 Handbuch der Cacteenkunde we are presented with a "Description according to Lemaire" which runs:

> "Stem upright, very dark green, pale bluish green in the upper part. Ribs blunt, somewhat tuberculate. Intercostal grooves fairly broad. Spines short and stiff, whitish.
>
> The described specimen has a diameter of 54 mm and 8 ribs of 1 cm height and of 1 cm breadth at their base. Spines 6-8, somewhat spread out, often regularly disposed and in this case 6 radial spines, of which one upper very feeble, the remainder like the projecting central spine 10-13 mm long, stiff, straight, thin, whitish, black at the tip"

We are also presented by Förster-Rumpler with a "Description according to Salm-Dyck", as follows;

> "Stem upright, thick, glossy green, later branching at the base. Ribs 12-14, blunt. Areoles close together, round, with sparse grey wool. Spines pale reddish-yellow, needle-like, straight. Radial spines 10, radiating widely, the lower always the longer. Central spine 1, somewhat more robust
>
> Stem about 60 cm tall, up to almost 8 cm diameter. This species distinguishes itself from Echinocereus strigosus by a taller stem, by less closely spaced areoles, through a larger number of radial spines and finally by the single central spine."

And then finally Förster-Rumpler observes "These contradictions remain to be resolved". Nowadays there appear to be even more contradictions to be resolved.

.....from G.J.Swales

Looking at my photocopy of Salm-Dyck 1850, the description given there is substantially followed by Förster-Rumpler. Salm-Dyck gives spines tawny, rather than pale reddish-yellow, stem two feet high and nearly 3 inches in diameter, rather than metric measurements - but there is no difference of any real significance.

.....from H.Middleditch

The "contradictions" to which Förster-Rumpler draws attention might have included the difference in radial spine count between 6 and 10. But current appreciation of variation in one population might well include accepting this difference within one species. On the other hand, the difference between a glossy green stem with 12-14 ribs and an 8-ribbed stem, very dark green and pale bluish green in the upper part, perhaps poses rather more of a contradiction. Bearing in mind that spachianus was initially mistakenly attributed to an

origin in Mexico, is it possible that a Trichocereus from such as Peru, or Chile, could have been the subject of the “8 ribbed, very dark green” description?

The original Lemaire description of 1840 was presumably based upon a plant in the Monville Collection. The original 1846 Förster ‘Handbuch der Cacteenkunde’ may have included a pre-1850 Salm Dyck description of Cereus spachianus. But in any case, by the close of 1845 the Monville collection had evidently become dispersed. Did a label get misplaced in the process and result in the contradictions between the Lemaire and the Salm-Dyck descriptions of this species? Or is there some other possible explanation? Perhaps there is.

For Cereus spachianus to be available in the Monville collection for Lemaire to describe it by 1840 (or 1839, per Kiesling) it must have been collected either in Mexico - as the original description stated - or in South America, prior to this date. Concentrating on South America, a surprisingly large part of Peru and Brazil had been assiduously botanised by this date. By comparison, the extent to which Argentina had been explored for cacti up to 1839 was very limited indeed. Some of the earliest exploration of the adjacent part of Brazil was undertaken by such well-known naturalists as St.Hilaire (Chileans No.30 & No.44) and by Sellow, who was in Brazil from 1814 and spent the years 1821 to 1827 travelling in Rio Grande do Sul and Uruguay. Gillies was resident in Mendoza from 1820-1828, still notionally part of Chile at that time, and despatched his collected material back to Britain.

The T.spachianus that is familiar to many growers is not entirely dissimilar to other Trichocerus from the eastern margins of the Andes, such as T.schickendantzii, T.shaferi, or T.narvaecensis and this might suggest that it originated from the same phyto-geographic zone. So which part or parts of this stretch of the eastern margin of the Andes had been visited by travellers from Europe who could have collected a specimen of what became known as T.spachianus, before 1840? In fact it had been visited to a very limited extent. Populated places were connected by long-established trade routes and travellers from Europe would appear to have kept to those lines of communication and not ventured into unexplored terrain. Especially where their own safety could have been at risk due to incursions from the nomadic indians.

.....from J.Tweedie. From Buenos Aires to Tucuman in 1835 (abstracts)

On the second of March our tropa left Buenos Aires. On this occasion it consisted of seventeen wagons, 240 cattle, 44 horses, 150 mules, and 32 persons. ... Early on March 6th we crossed the Rio de las Conchas, immediately after which we entered a grassy plain, undiversified by any change of scenery. .... After travelling over a grassy and somewhat undulating countryside, we arrived at the village of Lujuan. .... On the 12th we travelled all night through a trackless plain. At the village of Pergamena we quitted the province of Buenos Aires and entered that of Santa Fe. We now entered uninhabited pampas, occupied only by wandering indians; it was most desirable to pass through this country as quickly as possible, lest the indians should have time to collect and attack us for the sake of plunder. .... On the 25th our eyes were suddenly gladdened with a delightfuly fresh verdure, the Rio Corcorneon winding its way through richly wooded land. We halted this day at the post house of Lobaton. .... On April 4th we came to Los Ranchos and at sunset we crossed the Rio Secundo.

.....from F.B.Heads. Journeys across the Pampas, 1838 (Written 1836)

As it had been reported to the government of Buenos Aires that the Pampas Indians had invaded the country through which we had to pass, the minister was kind enough to give me an order to a Commandant who was on the road with troops, for assistance if required. And besides this, we purchased a dozen muskets, some pistols, and sabres..... The travelling across the Pampas, a distance of more than nine hundred miles, is really a very astonishing effort. The country is flat, with no road but a track, which is constantly changed. The huts, which are termed posts, are at different distances but upon an average, about twenty miles from each other.....In crossing the Pampas, it is absolutely necessary to be armed, particularly in the desolate province of Santa Fe. ... With respect to the Indians, a person riding can use no precaution, but must run the gauntlet. ..... We started at daybreak from San Luis, to go to the gold mines of La Carolina.

.....from H.Middleditch

The route across the Pampa taken by Head would appear to follow closely that taken by Miers and illustrated by a map which accompanies his 1825 publication describing hs own trip.

By comparison with the account given by Head, in other parts of the continent, Darwin’s accounts of his excursions from Rio de Janeiro, Brazil, and from Maldonado in the Banda Oriental (now Uruguay), give the impression that these areas were singularly free of any similar unrest. But in travelling from the mouth of the Rio Negro, to Bahia Blanca and then onwards to Buenos Aires, Darwin observes that “The wandering tribes of horse indians, which have always occupied the greater part of this country, have of late much harassed the outlying estancias.” On his subsequent excursion of “nearly 300 miles” from Buenos Ayres to Santa Fe, Darwin observes that “.... we arrived at the Rio Tecero. From Corunda to Santa Fe, the road is not very safe. The western side of the Parana northwards ceases to be inhabited and hence the indians come down this far and waylay travellers”.

.....from A.Coates, Quest for Plants 1969

It was not until 1816 that it was possible to enter the Argentine. For many years afterwards it was difficult to move about in it with safety. There were too many revolutions to be comfortable. James Tweedie emigrated to Argentina in 1825, having been trained in horticulture and rising to be head gardener at Edinburgh Botanical Gardens. He travelled up the River Uruguay in 1832; then made a disastrous voyage to Bahia Blanca. His third journey took him to Tucuman. .... He managed to send a box of seeds to W.J.Hooker at Glasgow Botanic Garden.

.....from W.J.Hooker, Journal of Botany 1834

An unassuming but indefatigable Botanist, Mr.Tweedie, has long been diligently engaged in collecting the vegetable productions on the Plata, the Parana, and Uruguay. He has since extended his researches to Santa

Catherina in Brazil. In his different excursions, Mr. Tweedie has collected upwards of 1000 species, which have been communicated to us, and will be more particularly noted in our "Contributions to the Flora of South America".

.....from W.J.Hooker, Companion to the Botanical Magazine, Vol.1, 1835

Since our last publication we have received three collections; one gathered by M.Isabelle in Rio Grande do Sul; the second gathered by J.N.Reynolds in southern Chile. The third by J.Tweedie in Tucuman which is bounded on the west by the Andes of Chile and has scarcely, if ever before, been visited by any Naturalist.

.....from H.Middleditch

The Argentina of 1839 bore not the slightest resemblance to the country we know today. There were country estates in the pampas around Buenos Aires, in constant danger from the raids of the warlike nomadic indians. As noted by P.E.James:

> "As late as 1876 it as estimated that something like 40,000 head of cattle were stolen every year in indian raids"

The towns of Santa Fe on the Rio Parana, Cordoba, San Luis, and Mendoza, appear to have been clear of any danger from the marauding indians. But the route from Buenos Aires to the Sierra Cordoba was effectively uninhabited, apart from the staging posts for the travellers and merchants, and even they were not safe from attack, as Heads recounts:

> "At San Luis I was advised not to go on alone [towards Buenos Aires] as the courier had been found on the road with his throat cut. .... we approached the post hut, which was in ruins. It had been burnt by the indians and the whole family had been murdered in it".

The incursions of the warlike indians were evidently still feared in 1858, when Burmeister travelled through the La Plata states, as the country was known before it became Argentina.

A JOURNEY THROUGH THE NORTHERN PROVINCES OF LA PLATA. By H.Burmeister
Translated by H.Middleditch from Zeitschrift fur Allgemeine Erdkunde. Vol IX 1860

My attention now turned to continuing my trip into the northern provinces of the confederation. My collection was put in order and on June 12 I went to Rosario to seek a ship to take my chests to Europe. In Rosario I came across a ship from Hamburg, the Tiger, and took my chests on board the following day, leaving for my onward journey by diligence on the 17th.

We crossed the bare open pampa. The summer drought had cut down all the grass, not a green blade was to be seen any longer. A dried up yellow undergrowth covered the otherwise quite bare ground. At eleven leagues from the town, the road meets the Rio Carcaranal and follows the southern bank. The river flows between two steep earthern banks and has a completely stoneless bed. Not a single bush, let alone a tree, was to be seen here. After 3 leagues we came to the third post station, Tottoras by name, where we stopped overnight. At 4.30 a.m. we restarted in moonlight; shortly before six the sun came up over the horizon, then a thick mist spread over the plain. ..... By 10, a cold wind from the NE had blown away the mist. At the post station Los Loros we found a formal defence work against the indians whose raids advanced as far as the Rio Caracanal. Then after a further 4 leagues we came to the post station Dos Arboles, similarly fortified against the indians.

At 3 a.m. on the 19th June we restarted, with an algarrobo forest on our left. After 4 leagues we came to the fortified post station Fray Muerto. Five leagues further brought us to Las Palmitas, similarly fortified. ..... Cattle grazed on the bare campo, where better grass grew than we had met with up to now. The road continues ... via Tio Pujio ...and Las Chanares. A quarter of an hour before the next post station I saw for the first time the peak of the Sierra Cordoba in the faint distance to the NW. ..... The next day we rode over bare campo. The ground was flat and level, like the previous stretch, without trees or bushes. ..... The nearer we came to Cordoba, the higher and thicker became the vegetation. I noted two different sorts of cacti in the thickets, a Cereus and an Opuntia. About a league from Cordoba, the trees started to disappear again, but this was due to human influence.

I was ten days in Cordoba. On the last day I took a ride along the broad longitudinal valley between the two ridges of the Sierra Cordoba .... and on 16 July I left for Tucuman, first crossing the Rio Primero. The road goes to the north along the foot of the eastern branch of the Sierra Cordoba, gradually getting further away from the mountains. The area was pretty open country with sparse dwarf bushes, which gradually became higher the further we left Cordoba behind us. ..... On the following day we were up at 4 to be off at 5. As I stepped out of the door I found the ground almost frozen ..... and some small puddles completely covered with ice. Five leagues from Rosario we came to La Guerra, a further 2 leagues to Salitre; before reaching it we found a low bush covered ridge stretching out from the Sierra in the west ..... then a low marshy area still covered in finger thick ice.

Between Caroya and Divisaderos .... we saw at a great distance a high Sierra. After an hour, a road goes off to Totoral; from the high coachman's seat we could see the houses. ..... the road follows the valley between the Sierra Totoral and Sierra Divisadera. After an hour, a broad road turns off to Catamarca. We stay in the valley covered with bush forest which became higher and thicker so that we had no distant view.

[Passed through Santa Cruz, Las Cocas, and Chanar with 500 inhabitants, to Portezuelo and Orquetas].....the area between Portezuelo and Orquetas appears to be covered with dwarf bushes, above which the weatherbeaten bare granite outcrops project. Furthermore solitary large cacti appear - tall stemmed huge Opuntia. Later the thickets became more picturesque, on account of the appearance of the Quebracho. Because I could not identify this botanically, I took with me some of the numerous oval frut, from which it was established that the tree belonged to the Apocyne.

.....from H.Middleditch

Around 1840, any carriages, or the wagons taking merchandise, which were going north from Cordoba would follow the eastern foot of the Sierra Cordoba, just as Burmeister describes not twenty years' later. Leaving behind the northernmost outlyers of the Sierra Cordoba, this road then heads north across the Chaco plain for Santiago del Estero and Tucuman. The name of each place through which this route passes is quoted by Burmeister, several of which can be located on an up-to-date map. However, the "broad road that turns off to Catamarca" is once again mentioned later by Burmeister as starting from Catamarca, following the foot of the Sierra Ancasti to its southern point, then crossing Salinas Grandes more or less where it is now crossed by the railway line, then skirted the northern end of the Sierra Cordoba, to join the Cordoba to Tucuman road..

Burmeister describes his subsequent journey from Tucuman to Catamarca on horseback, finding the track difficult to follow in places because of the growth of vegetation. This is somewhat unexpected, since it had probably been in use for over 200 years - which would also explain why his party passed no small number of isolated habitations en route.

From settlements or the rather isolated mines - like the isolated copper mine at Capillitas owned by Samuel Lafone of Liverpool, produce which was to be exported would have to be brought to the cart road by mule or pack horse who would return with provisions - not just foodstuffs, but requisites like picks, axes and hammers. There was no coal or ironstone mined in South America at this date so even nails had to come from Europe. Around 1840 there were not a great number of such isolated spots away from the main settlements and main routes, so there would be few opportunities away from those routes for any natural historian to tag along with a mule train in Argentina and do any collecting.

There is no problem in placing the Salm-Dyck publication of Echinopsis leucantha in 1831, either along the cart road to Mendoza or in the area around that city which was visited by Gillies. The Stetsonia coryne described by Salm-Dyck in 1849 probably came either from the along the cart road between Cordoba and Tucuman, or along the branch road going to Catamarca, or along the lowlying parts of the Tucuman to Catamarca trail. So whereabouts would a wagon road, or one of Burmeister's "main roads", or a mule track, pass any moderately tall Trichocereus with 2 to 3 inch thick stems, in 1839? .

There were Spanish settlements established at Tucuman in 1565, and at Salta in 1582. Communication with the seat of the Viceroy at Lima would be via Upper Peru (Bolivia) and Jujuy. The same route would remain in use both until the 1830's and afterwards, by carriers, merchants, and couriers, This route does pass through areas where plants exist which fairly well fit with the original description for Trichocereus spachianus. It is far more likely that any plant collected in or about the 1830's would be from close to a well-established trade route such as this, rather than from wild and otherwise untravelled parts of what is now Argentina.

So do we assume that the original T.spachianus came from some place close to one of these well-established trade routes in Argentina? Or did Monville acquire his plant either directly or indirectly from one of the recipients in Europe of any Trichocereus collected by Gillies on the route from Chile into Mendoza, Argentina, before 1828?

.....from R.Purves.

My tall and solitary Trichocereus spachianus is now 58 inches high and almost touching the greenhouse roof, but it has not yet produced any branches from the base. Looking somewhat similar is my second plant of this sort which is 60 inches tall, and does have three branches of not quite all the same length from the base of the main stem.

.....from Jardin Exotique, Monaco

We are growing several Trichocereus spachianus in the Garden. It can grow up to 2m high, with stems 5 to 6mm in diameter, it branches from the base and has 10 to 15 ribs. It fairly well fits the description of this species. The areoles are about 1 cm apart, large, covered with curly yellow wool, turning white or grey with age. Radial spines are 8 to 10, of length 6 to 10mm, spreading, amber-yellow to brown, central spine 1 to 3, yellowish, 12mm long, longer and stronger than the radials. All spines becoming grey with age.

.....from H.Middleditch

Pictures of three plants in the Jardin Exotique were received with the above, one of presumably a long-established plant to judge by the numerous basal offsets. Most interesting, however, are the two branches arising from part way up what may be the original main stem.

.....from R.Purves

The smaller of my two plants of this species better fits the original description, in areole pitch, spine count and spine length, as well as with the data from Monaco for their plant. The depth of the ribs is also less than on my larger plant, which has more ribs and far more spines per areole. I have now compared both my supposed T.spachianus with the pictures from the Monaco Jardin Exotique and the smaller of my two plants is virtually similar.

.....from K.Gilmer

I have found out that from 1951 to 1955, Backeberg was employed as a scientific staff member of the succulent garden "Les Cedres" at Saint-Jean-Cap-Ferrat in southern France, at the collection of Marnier-Lapostelle. And there he started to write his most important work, the "Die Cactaceae".

In Volume 1 of the Die Cactaceae, Figure 26 on page 30 is titled "Part of the Cereus collection of the author now present in the Monaco Jardin Exotique". The Jardin Exotique is only about 10-15km from Cap-Ferrat. As far as I know, at this time the Jardin Exotique cultivated numerous plants that were inported by Backeberg.

.....from H.Middleditch

It is quite understandable that Backeberg would find it very handy to be able to readily consult his habitat collected plants whilst writing his Die Cactaceae. So is the multi-stemmed Trichocereus spachianus now

growing in the Jardin Exotique an original Backeberg habitat collected specimen? Does it have any provenance?

.....from Jardin Exotique, Monaco

We have no information regarding the origin of the Trichocereus spachianus growing here.

.....from H.Middleditch

1905 Spegazzini account of this species refers to its occurrence in (amongst other places) provinces San Juan and Mendoza. An article by H.Borth in K.u.a.S 26.11.1975 on "Flowering cacti in the Argentinina highlands" repeats this location, but might that be simply a repetition of the Spegazzini data? Of the Trichocereus actually recorded in more recent years from this area, apart from semi-decumbent sorts, T.strigosus is said to grow up to 60cm tall and T.terscheckii up to 15m tall, neither of which would suit T.spachianus.

However, is it at all possible that the original "Cereus" spachianus originated from the Chile side of the Andes in this area? If this was actually collected from the slopes of the Andes at no great distance from Mendoza, it would raise the possibility that this might be associated with the T.chiloensis which grows not far away on the Chile side of the border.

.....from R.Mottram

In an article by Munoz Pizarro in the Sinopsis de la flora Chilena, 1959 there is a Plate 40 of (Echinopsis) Trichocereus chiloensis. This includes a drawing of a flower where there are fairly large scales covering much of the flower tube, somewhat similar to the flower on the plant being grown by R.Purves.

.....from H.Middleditch

My initial reaction to this drawing of T.chiloensis was to note that there were branches arising from part way up the two tallest stems and at the time I discounted the possibility that this might be closely related to T.spachianus. But as a result of seeing the picture of the plant growing in the Jardin Exotique with a stem producing branches in this manner, I feel obliged to consider that these two names might be closley associated. This part of Chile was searched by Gillies in his field trips around the 1830's. It may not be entirely impossible that he was the original supplier of an example of Trichocereus spachianus.

Which brings us back to the "Trichocereus spachianus ZJ 86" which is recorded in the ZJ list as T.chiloensis.

.....from R.Purves

Looking at the 1959 Munoz Pizarro drawing of the flower of T.chiloensis, I would say that the disposition and size of the scales and the amount of hair protruding from them is about the same as on my own supposed T.spachianus.

.....from R.Mottram

There is no possible conformity between T.spachianus and T.chiloensis. The flowers on T.chiloensis have the receptacle tube curved upwards so that the axis of the corolla is almost parallel to the stem. On my FR 228 the flowers were 16cm long and 11.5cm in diameter, the corolla funneliform in shape - the flowers do not expand beyond this. The flowers on T.spachianus are of a different structure, they are held horizontally and expand rotate and very wide - as broad as long.

.....from R.Moreton

During our field trip to Chile I was able to take a close look at plants of Trichocereus chiloensis and they look to me to be quite different to the plants we are familiar with in cultivation as T.spachianus. Most obvious are the longer and stronger spines on T.chiloensis. The flowers that we saw on these plants do face upwards, but are not quite vertical, a different attitude compared with those on T.spachianus..

.....from D.Metzing

There is an article on T.spachianus in the German Cactus Journal of the year 1900, with a picture of a plant in cultivation in the La Mortola gardens.

.....from H.Middleditch

This picture is a very poor reproduction but it is just possible to see that there are six ribs in camera view.

.....from R.Purves

Not only is the appearance of the stem very similar to my own T.spachianus but the two flowers in that picture are pointing sideways, almost exactly the same attitude as when my own plant displayed just two flowers.

.....from G.Charles.

My observations of T.chiloensis in Chile suggest that the further north they are growing, the plants get shorter and spinier and the flower tubes get shorter, in line with the less rainfall. The most northerly populations, in the Elqui valley, have very long spines up to about 25cm. Branching is usually from near the base, but occasionally branches appear higher up. The flowers always stood almost vertically.

.....from H.Middleditch

Does this rule out T.chiloensis as the possible origin for T.spachianus? Where else might it be worth looking for an origin for T.spachianus? On the inside cover of his "Stachlige Wildnis" Backeberg has an elementary map of the routes which he took in his six field trips to South America, which presumably gave him an acquaintance with the cactus flora to be seen en route. But there is no indication of whether he saw T.spachianus at any particular location. However, he does refer to his T.vollianus as "similar to spachianus". His location for T.vollianus as not far from Cochabamba would certainly be accessible to a traveller from Europe in about 1840. More recently F.Vandenbroeck has made over two dozen field trips to various parts of South America which have taken in this area - did they include any sighting of T.vollianus?

.....from F.Vandenbroeck

In the New Cactus Lexicon, Trichocereus spachianus is said to be "untypifiable and of uncertain origin".

I believe that the only solution lies in the comparison of the plants in culture with similar plants in nature. Of the plants that I could observe in nature that in some way or other (because of their variability) remind me of T.spachinaus, there would be four or five sorts of Trichocereus, including T.lamprochlorus, but especially T.vollianus. This last is quite interesting as it seems to be very close to what is conceived as T.spachianus. I found these plants in flower somewhat west of Punata (east of Cochabamba, Bolivia). It was early in the morning and the flowers were still odorous. They were growing in a rather luscious shrubby area and measured up to about 1.5m tall. They did not seem rare, as other groups of these plants were to be seen in the area. It cannot be denied that these plants display a certain resemblance to the cultivated Trichocereus depicted on the pictures from R.Purves.

.....from R.Mottram

I rather suspect that Cereus spachianus Lemaire was the same species as Cereus lamprochlorous, collected at the same time, and which Lemaire described two years earlier. His decription of lamprochlorous could equally well fit both of the plants that we grow under these names today. One of the unusual characters of the C.spachianus as we know it is the bright shiny green epidermis, and Lemaire also described C.lamprochlorous as having this characteristic - "nitide belleque virens" (glossy and pretty green). Lamprochlorus is also the Greek for "shiny green".

.....from H.Middleditch

We have the 1.5m height for T.vollianus in habitat from F.Vandenbroeck, but the early descriptions of Cereus lamprochlorus appear to lacking in detail of height. Schumann in 1903 says that "it reaches only about 1.5 to 2 m" in height.

In his 'Die Cactaceae' 1959, Backeberg refers to a plant seen by Cardenas that is "comparable to T.lamprochlorus" en route from Colonia to Cochabamba, Bolivia, which has 15 ribs with "12 radial spines directed sideways and outwards, about 1cm long, and a single longer central spine". Most interesting is the Backeberg picture Abb.1084 of this Cardenas plant, which has the flowers in the process of opening, which face directly sideways. Again it is in the area around Cochabamba which would be accessible to collectors from Europe in the 1830's. Is this the closest comparison we have to date for T.spachianus?

.....from R.K.Hughes

On a visit which was made to Bolivia in company with B.Bates in December of 1992, we left Cochabamba to pass through Quillacolla and then turned to the north, where we followed a stiff climb. We made a stop at a spot (BDH 63) lying 18.8km to the north of Quillacolla, between two steep walls of a narrow valley. A view along the valley looked quite green as is it has had some recent rain - or the air was very moist despite underfoot being dry, dusty gravel. However, the view across the valley clearly showed that there were many areas of gravel or scree among the greenery, which appeared to be mainly stunted shrubs and other non-cactus herbage.

The first cacti that we encountered was a Cleistocactus of perhaps a little more numerous than the few Trichocereus we found and of a similar size. At ground level there were some small clumps of Austrocylindropuntia vestita with very little hair and very long spines, a number of them having red flowers. Also there were a number of Echinopsis obrepanda that were in bud but not advanced enough to be able to see the flower colour.

The tallest Trichocereus at this BDH 63 location were up to chest or head height, whilst a number of them were hardly above head height. There were no flowers to be seen but a number of fruits that contained ripe seed, some of which I did collect. Looking at the pictures that I took of this Trichocereus RKH 268, there appear to be 7 ribs in camera view or a rib count of more or less 14 for the stem. In this respect it is similar to the T.spachianus grown by our Treasurer and to the T.vollianus photographed by F.Vandenbroeck near Punata. In habitat this RKH 268 Trichocereus appeared to have somewhat longer spination on the upper 12 to 18 inches of the stems, by comparison with the shorter spination on the lower lengths of the stems.

.....from G.R.Allcock

I do have plants of both Trichocereus spachianus and T.vollianus, grown long ago from commercial seed. The picture of T.spachianus in the collection of R.Purves matches my own specimen of this species very well indeed. My spachianus have 11-13 ribs with thin yellow-brown spines up to 12mm long, whilst my vollianus has 14 ribs with similar spines up to 13mm long. and both have stems of 4.5cm in diameter.

In view of the great similarities in both appearance and vegetative statistics, I find myself of the opinion that my T.vollianus and my T.spachianus belong to one and the same species.

.....from J.R.Kirtley

In the course of a field trip to southeast Bolivia, a stop was made on the way from Tolata to Cochabamba, where we saw some plants of Trichocereus. Looking at my picture of one of these plants, with vertical stems branching from the base which would be about one and a half to two metres in height, I would be inclined to say that it is quite a good match for the Trichocereus vollianus in the picture taken by F.Vandenbroeck.

.....from W.Christie.

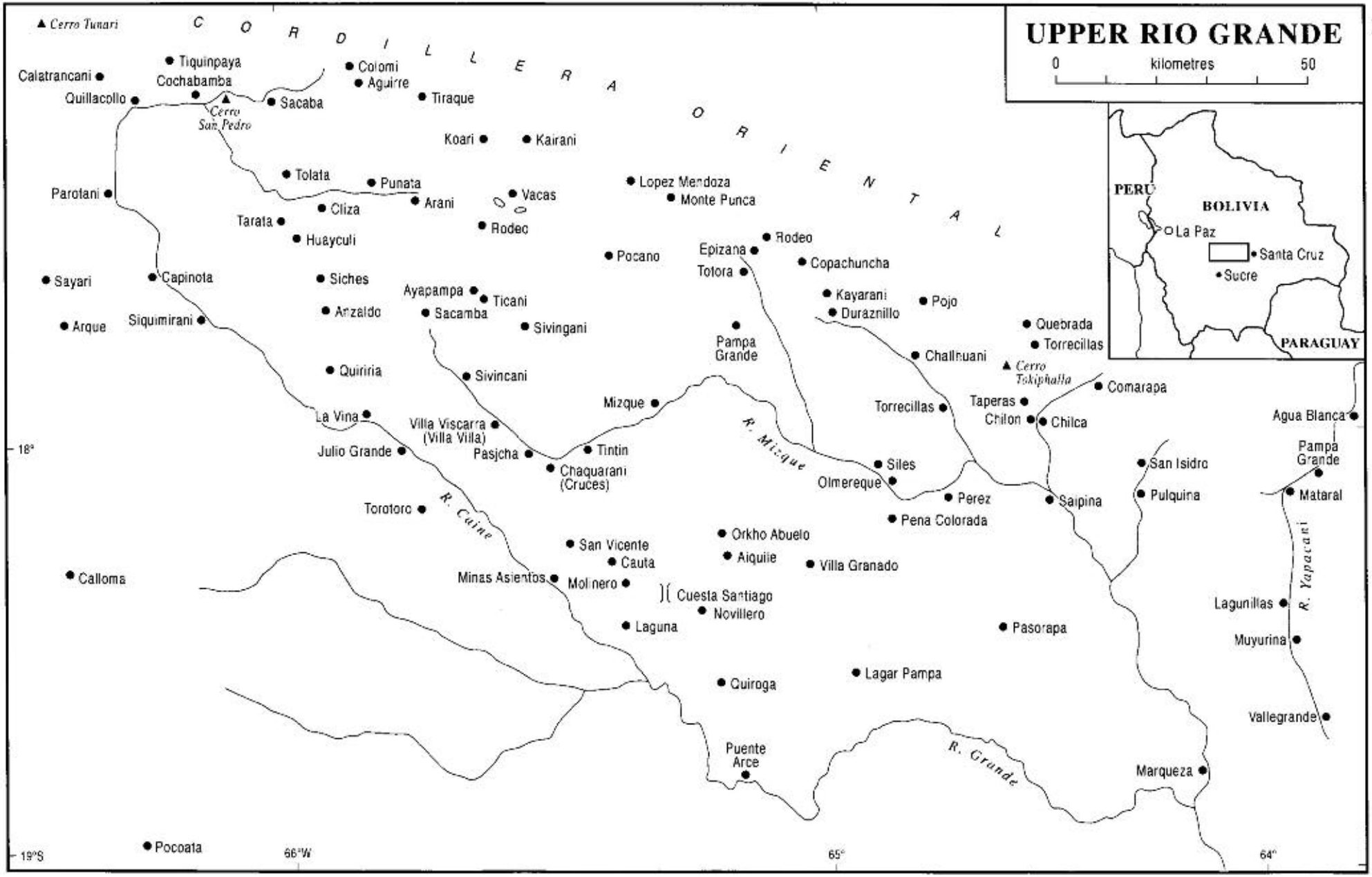
When we were on a visit to Bolivia we stopped only a few miles to the south of Sucre when we saw some Trichocereus growing fairly near to the roadside and then a short distance further on we saw a similar Trichocereus which would have been about five or six feet tall, growing in company with some bushes. All these plants would have about six ribs in camera view. Later on, we were able to identify them as T.vollianus.

.....from H.Middleditch

The pictures of these plants make a good match with the T.spachianus grown by R.Purves.

.....from M.Lowry

The habitat in the near and far surroundings of Cochabamba has been visited on several occasions in the course of making a number of field trips to Bolivia. At about half a dozen places, some not a great distance


UPPER RIO GRANDE
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CORDILLERA ORIENTAL
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Tiquinpaya
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Cerro San Pedro
Sacaba
Colomi
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Tiraque
Koari
Kairani
Tolata
Punata
Parotani
Arani
Cliza
Tarata
Huayculi
Vacas
Rodeo
Lopez Mendoza
Monte Punca
Pocano
Epizana
Rodeo
Totora
Copachuncha
Kayarani
Duraznillo
Pojo
Sayari
Capinota
Siches
Ayapampa
Ticani
Arque
Siquimirani
Anzaldo
Sacamba
Sivingani
Pampa Grande
Quebrada
Torrecillas
Challnuani
Quiriria
Sivincani
▲ Cerro Tokiphalla
Comarapa
Mizque
Taperas
Chilon
Chilca
Agua Blanca
La Vina
Villa Viscarra (Villa Villa)
Julio Grande
Pasjcha
Tintin
Chaquarani (Cruces)
R. Mizque
Torrecillas
Siles
Olmereque
Perez
Saipina
San Isidro
Pulquina
Pampa Grande
Mataral
Torotoro
R. Caine
Pena Colorada
Orkho Abuelo
San Vicente
Cauta
Aiquile
Villa Granado
Calloma
Minas Asientos
Molinero
Cuesta Santiago
Novillero
Laguna
Pasorapa
Lagunillas
R. Yapacani
Muyurina
Lagar Pampa
Quiroga
Vallegrande
Puente Arce
R. Grande
Marqueza
Pocoata
18°
19°S
66°W
65°
64°
PERU
BOLIVIA
La Paz
Santa Cruz
Sucre
PARAGUAY

from Cochabamba, others well to the south of that city, a stop was made to look at and photograph Trichocereus which were recorded as T.vollianus. These were growing in clumps of various dimensions, some with stems as high as about 2m., some with several dozen stems. many in smaller clumps or with shorter stems. The BLMT 5 and 643, a fw kms to the south of Cochabamba, and the BLMT 652, about 70km SE of Cochabamba, are closest to the location of the Vandenbroeck picture taken near Punata, east of Cochabamba. The plant in his picture is a good match for the T.vollianus that we saw.

.....from C.Backeberg, Die Cactaceae Vol.2

Trichocereus vollianus - from the area Cochabamba - Arque.

.....from H.Middleditch

This Backeberg location falls within the area of the BLMT recorded sightings for T.vollianus. (See Chileans Upper Rio Grande map). This area surrounding Cochabamba had also been visited by Europeans for some years at the time that T.spachianus first appeared in the Monville collection so that habitat collection of this original plant could have been made there. Whilst in the past there does not appear to have been any real study of the origin of T.spachianus, from the above review of the possible origins for this plant, it would now appear to be possible to say that it is the plant given the name of T.vollianus by Backeberg, i.e. Trichocereus spachianus Lem., synonym T.vollianus Bckbg

RUNNING ROUND THE BLOCKADES IN BOLIVIA By J.Carr

On our recent trip to Bolivia we started out from Santa Cruz and our first stops were near Camiri. For most of the way down from Santa Cruz the shrubs and trees were being cleared to produce small farms and grazing land for the local peoples. Formally the land had been owned by large landowners and was the western edge of the Chaco, but it was returned to local ownership by the new President and it remains to be seen how viable that will be. At Camiri we headed west into the hills and the road followed a small river. Gradually the vegetation became a little more open with bare rocks between the trees.

Here we found a Cleistocactus sp., which were small vertical plants with flowers like C.brookii. From previous finds, this plant would seem to vary at different locations with vertical, semi-vertical, and pendulous forms to be found over a large distribution area. I had also noticed that the spines vary at different locations, from soft and flexible to rigid and sharp, depending on location. Some forms may need to be described as subspecies.

After two nights of sleeping in the car and clambering over hillsides in high daytime temperatures, we returned to Camiri for a well earned rest. On the next day we drove to Villamontes, avoiding a road block by driving through the town. On the way we photographed bulbs in flower along with the Cerei and Trichocereus along the road, with only one or two in flower.

On the following day we went through the riverside pass after Villamontes and then towards Tarija. At a village to the east of Tarija we turned north and travelled to just beyond Alto Cajas. The higher altitude vegetation consisted mainly of coarse grasses but as the road dropped the slopes became covered with trees whilst at one rocky area this gave way to stands of Cleistocactus strausii. Eventually we came to the Rio Cajas at an altitude of 1500m. The vegetation here was semi-tropical, with dense bushes and trees on the slopes. Where the slopes were steepest, bromeliads and cacti grew, often just above the flood line alongside the river.

We spent the night in the car on the river bank as the rivers are dangerous at this time of year. One thunderstorm many miles away can cause flash floods and a small stream can become a raging torrent in a matter of minutes. In the morning I was covered with mosquito bites - a problem of low altitude and proximity of water. We looked on the local cliffs and just in this locality we found Cereus hankeanus, Cleistocactus micropetalus, and Gymnocalycium pflanzii on the far bank, with an Echeveria sp., Parodia gracilis, Pfeiffera ianthothele, Aylostera flavistyla and Aylostera aff.pulvinosa on the near bank. It was in no way unusual to see different groups of cacti on each side of a river - one set on the sunny side and the other set on the shaded side. There were few flowers to be seen and only on the A.pulvinosa.

At this location, A.pulvinosa grows as a clump and A.flavistyla as single heads. These Aylostera were growing together on the river banks just above the high water line, under the shade of the overhanging trees and were difficult to photograph because of the steep banks. They were growing with the Echeveria and the odd Parodia in an area of only a few square metres.

The A.pulvinosa were different to the ones that I have seen in collections, in that the flowers were orange and the spination was very close to A.albiflora. More work is necessary in this area to determine whether there is one variable species here or several separate species. We travelled 5km downstream, following the track which was either in or on the edge of the river. The river had only a small amount of water in it and this often disappeared underground so that we had little difficulty in looking at both sides of the river in suitable places, but we found no more Aylosteras! In most places the banks were too steep or too densely covered in vegetation for us to look far up them. The hills rose for over 1000m on each side of the river.

We returned to Tarija that evening and then spent the next day to the north-east of San Lorenzo. Here there is a small area at 3km to the north of Temporal of around 3 square kms where we found five different species of Aylostera - theresae, deminuta, fiebrigii, pulvinosa, and spinossisima (archibuiningii), growing with Sulcorebutia pilayensis at one stop. The finding of A.spinosissima to the north of Tarija was quite a surprise as its most northern known habitat was well south near the Argentine border.

We then headed for Iscayache on a road that started at San Lorenzo and passed to the north of the usual route, but as yet it is unfinished. Here we found Sulcorebutia tarijensis only 5km from San Lorenzo but on the rest of that journey we did not find any cacti. However, the scenery was fantastic and a family of Condors

flying around us ar about 3500m. altitude was some compensation. At Iscayache we turned south and then east where we found perhaps the most variable population of Oreocereus celsianus, with all spines and hair colours, on stout stems, which carried one or two flowers, some fruit, and a lot of buds. This may possibly be Ritter's Oreocereus maxima. Also here we found large populations of Trichocereus tarijensis with white spination. Some sites carried small plants of up to 1m. in height and other populations consisted of plants up to 10m in height with a few plants branching dichotomously. At two different locations we also found two plants of a hybrid betwen O.celsianus and Cereus bertramii, growing with millions of Cerei. To the north and west of Iscayache we discovered a population of Soehrensia formosa with plants up to 5ft. tall. whilst others had formed large clumps. These are spectacular plants quite unlike the Soehrensia randallii we had seen at an earlier stop.

We then went along the road to the Cinti valley, which we followed northwards. Before reaching Camargo we turned off to the east on a minor road climbing out of the valley, where we discovered large populations of Parodia subterranea, growing through bare stony fields at 3500m, which is a somewhat higher altitude than those we found in the Culpina basin. The objective of this trip was to locate Sulcorebutia camargoensis, but we reached the end of the road where we were overlooking the Culpina basin and so had to retrace our steps without finding it.

We then travelled into the Culpina basin where we attempted to climb back into the hills to where we turned back on the day before, but we were defeated by a dam building project at the head of the valley, that seems to have destroyed the roads there. However, just to the north of the town of Culpina we did find P.subterranea growing with P.occulta, where there seemed to be no intermediate plants in this population, so I doubt that these are the same species as suggested in the New Cactus Lexicon. Also to be found in this area were Aylostera albopectinata, Echinopsis mamillosa and Echinopsis obrepanda. On one of the roads we took, we found ourselves looking at a wide area of almost level ground where we could see a large number of Lobivias in flower. We did see Lobivias in several other places, but having had a good look at one population we did not stop to look at any others. It was interesting to see that not only were the flowers on the Lobivia red in colour, but that the flowers on the Rebutia as well as on the Parodia were also red. Presumably, if bees were the pollinators, once they had found pollen in one red flower, they would go to other red flowers as well for pollen. These Lobivias were probably the L.culpinensis described by Ritter.

From Culpina we returned to the Cinti valley at San Pedro and then travelled north with the intention of going to Sucre, but at Padcoya we found the road was blockaded, and even the road to the north from Padcoya was not accessible. So we headed east from Padcoya in an attempt to find some other way north. We spent three days trying different routes to the east of Padcoya. Among the plants we found on our first route were Lobivia minutiflora and at one location this was growing in company with Lobivia chrysochete - these plants are totally different to each other and are not the same species. Both are clumping globular plants, but there the similarity ends. The L.chrysochete were up to about four or five inches in diameter and had typical Lobivia flowers of about two inches across when fully open. The L.minutiflora had a quite different spination, the individual heads were up to about one foot across and the flowers were not much over half an inch across when fully open. These plants were growing on a moderate slope which carried a good cover of grass tussocks which were about a foot high, so that we did not see these plants until we started to walk away from the road. Growing with them we found a Parodia sp. at just over 4000m altitude, which must be the highest recorded Parodia.

Two years earlier, when travelling with J.de Vries, we had seen similar plants growing within 50m of each other, between Tarvita and Icla, but there they were growing on slightly sloping stoney ground which was virtually bare of any other vegetation..

Trying a second route from Padcoya, we found a Weingartia sp. growing with an attractive Corryocactus sp.. We got stuck in mud when trying to cross a river and with the help of some locals were free after four hours. We had to go back because the crossing was 1km upstream and a thunderstorm was imminent. On our return to Padcoya the blockade was still in place so we were obliged to take a very circuitous route via Tarija, a two and a half days journey with temperatures in the mid forties. It was noticeable that almost all the bulbs we had seen when coming from Santa Cruz had now finished flowering and disappeared into the foliage. There was one exception - a nice group of Hippeastrum cybister.

Back at Camiri we then turned east via Monteaguado, finding several populatons of Cleistocactus brookii, which were mostly of the trailing form. We attempted to reach Sucre from the east but the road was closed during daylight hours, so we turned round at Zudanez, ending up in Padilla. On the way we found the newly described Sulcorebutia heliosoides growing with a different Sulco. which had green bodies and black spines, now described as S. viridiss, along with S.crispata and S.hertusii.

Later we crossed the Rio Grande and stopped to look at the Vatricanias. The area was extremely dry but thousands of these plants remain and a light shower finished the day. On the following day we headed for Valle Grande and stopped on the way to look at S.vargasii, which are probably related to S.langerii which grows north of the town. Then it was back to Santa Cruz.

.....from H.Middleditch

An early stop on this trip was north of the Tarija to Villa Montes road, near Alto Cajas. There appears to have been very few cactus visits to this locality, one of the first possibly having been made by F.Ritter.

An Aylostera pulvinosa was seen early in the course of the above field trip, of which there appears to be little mention in the literature. A search through Ritter's book "Forty Years Adventuring" finally brought to light a few lines which apparently relate to Rebutia albiflora and R.pulvinosa, where he observes "I wished to collect seed in the Cajas valley, taking the opportunity to make notes and take photographs, and went from

Tarija via Junacas to Polla, where the road comes to an end and so I had to park the wagon and walk down the path right down to the bottom of the valley. There the stream was very swollen and I had to remove my socks and trousers in order to wade across to the other side." Ritter then refers to meeting a local inhabitant and then going "a couple of hundred metres downstream" he found somewhere to stop overnight - for February 4 of 1963.

.....from R.Mottram

The names of Rebutia albiflora and R.pulvinosa were first published in Taxon 12(1):29 of 31 Jan. 1963 under the authorship of Ritter and Buining, but this was only a Latin description without any additional comments or observations. In the C&S.J of GB for November 1965 these descriptions were repeated by J.Donald but with a more detailed description in English together with a few additions. These included a habitat location for R.albiflora "as for R.pulvinosa but higher up the gulley in a subtropical climate. Furthest into the hot zone of Rebutia". Donald also refers to his "own observations on imported plants in the collection of A.F.H.Buining".

.....from H.Middleditch

The 4.2.1963 observation (above) by Ritter does not make any reference to collecting plants, so does this suggest that some plants had been collected at an earlier date by Ritter and sent to Buining, where they were seen by J.Donald prior to 1963?

.....from R.Mottram

In Englera 16 the habitat location for FR 766 R.pulvinosa recorded for herbarium specimens collected in 1958 was given as "gorge of the Rio Pilaya" for one and "Huerta Carbajal" and "Rio Cajas" for two others. For FR 766a R.albiflora the habitat location - but with no date of collection - was given as "Rio Cajas, valley of Santa Rosa, No.15a".

.....from B.E.Leuenberger, Biographical Notes on Friedrich Ritter, Englera 16, 1995.

In the first two months of 1958, Ritter visited a few places in northern Chile. At the end of February 1958 he was in Arica and planned a trip to Bolivia. ... which he undertook without a vehicle because of the cost. .... 14th April 1958, to Junacas, Cajas - Rio Pilayo (affluent of the Rio Pilcomayo).

.....from F.Ritter, Forty Years Adventuring

It is the 20th April 1958 and I am today back in Tarija from my very long trek on foot. Since on the way I would have no prospect of keeping a diary, I left my Journal here so that today I updated my records. On the previous trek on foot from Palos Blancos to the Rio Pilcomayo, the weight of the heavy rucksack caused me considerable pain, which has still not cleared up. So, this time, for a much longer trek, I reduced the weight of the rucksack as much as possible. I left the heavy photographic apparatus and tripod here so that I would be able to bring back with me some rather small specimens of attractive flowering cacti in bud, so that I could photograph them here in flower.

On April 14th I left Tarija in a lorry going to Junacas, where I could get a midday meal. From there, I went on foot through territory where cacti were very sparse, as far as Cajas, which lay at a fairly high altitude. From there I took the footpath into the Cajas valley to the Rio Pilaya, a tributary of the Rio Pilcomayo. Right from the start of the descent there began a good cactus country. I kept stopping here so often, that on this day I did not get very far. A man gave me a lodging in a hut just as the light was fading. In this whole area, up to the Rio Pilaya, the indian language was no longer spoken, but only Spanish.

The next day, at first light, The owner of the hut gave me a young indian to show me along the way for half an hour. After the youngster had left me, I became aware that my notebook was missing and since I must unquestionably make notes on the way, I had to go back to find the missing item at my bedside, where I was provided with a meal.

Then I continued on my way and very soon I found my first Parodia, published later as Parodia gracilis. This genus was the high point of my trek. After I had collected some seed of it, I went round a waterfall by a steep descent and now came to to a much larger valley, where for hours at a stretch one had to make ones way over stones, gravel, and boulders, so that progress was very slow. On this day there was no hut to be seen down this part of the valley and so I had to spend the night at the side of the path, where I was plagued throughout the night by swarms of midges.

Finally I made a fresh start at the first light of dawn, when I found a cliff where I came across another new cactus. I ate my provisions. Soon I reached the first orchard, which had been abandoned, and was now occupied by an Indian family. On this day I reached th Rio Pilaya via Colpana. Here also there was an orchard and growing sugar cane, whose owner is not there, but only an Indian who attended to the watering. There I stopped overnight, sleeping on the ground outside the hut. On the next morning I made a trip both upstream and downstrem of there. It is not possible to go very far, because soon walls of rock, which rise straight up out of the water, bar any further progress.

Nevertheless in the dryest months a path along the river would be usable, even with loads, over many otherwise impassable places which could only be passed by swimming and with floating tree trunks. I would gladly have worked my way upstream to the point where a vehicle track came to the river, but in such a situation I had to take the same route back again towards Tarija. But again on the way back I was able to complete my essential observations on the cacti.

.....from H.Middleditch

The date of this trek in April 1958 matches the collection date for FR 766 Rebutia pulvinosa given in Englera 16, so it appears that this particular expedition undertaken by Ritter will be when he first found his R.pulvinosa and his R.albiflora, in the valley of the Rio Pilaya. If he did bring some of these plants back to Tarija and photographed them there, before they were sent off to A.Buining, will those pictures be still in existence in Ritter's records? If any such records do even exist?

.....from Englera 16

It became known that the Ritter archive, which rests in the custody of the Kassel Branch of the German Cactus Society, according to Ritter's last will, contained a set of some 1600 original seed samples.

.....from R.Mottram

Ritter's library and slides finished up in the hands of Else Godde in Germany. On her tansfer to a care home, her relatives were about to dispose of her library to waste when its existence came to the attention of Karll-Werner Beisel. He acquired these and subsequently the Ritter slides and part of Ritter's library found their way to D.Hunt, who now has plans to publish a book of Ritter's photos.

.....from A.de Barmon

I have about 5 plants of R.pulvinosa and about 10 plants of R. albiflora. The R.pulvinosa has orange flowers which are self-fertile with fruit which holds betwen 5-50 seeds, whilst the R.albiflora flowers are pinkish white and are self-sterile, having a very low successful rate of pollination, with smaller fruit holding only 1 to 20 seeds. The style on R.pulvinosa is straight but on R.albiflora it has an odd S-shape, surely unique in Rebutia?

.....from H.Middleditch.

But is it possible that this peculiar shape of style is an abnormality which is only to be found in one clone?

.....from R.Mottram

I do not recall seeing a style of an S shape on any fully opened cactus flower, but I can recall finding a style of this shape on a flower of Cleistocactus shortly after it opened, when the flower opening may have been delayed due to some cause - such as a cool day - whilst the style continued growing in length. At times I have seen unopened stigma lobes projecting above the petals of an unopened flower, not only on various Rebutia but also on other cacti.

.....from H.Middleditch

Later in this field trip, mention is made by J.Carr of a Lobivia seen in the Culpina basin, with red flowers, as being possibly L.culpinensis.

.....from K.Preston-Maffham

Near the place where we crossed the river at Culpina we saw some huge plants of Lobivia ferox, almost one metre tall, but only in restricted numbers. They were growing among the rocks on sloping ground above the river. These were logged as PM 179 and we also collected some seed from a somewhat more flattened plant which did not quite look like the large L.ferox, later identified as PM 179a. In addition, the flower on this plant is not of the Lobivia ferox form, but we have not been able to put an identification to it.

.....from R.K.Hughes

We did see some Lobivia ferox at about 2km below Salitre and a plant collected there has flowered for me, with a white flower which was tinted pink.

.....from H.Middleditch

The Ritter description of his Lobivia culpinensis gives a flower colour as "somewhat orange-yellow, rarely blood red". On the other hand, Rausch, in his Lobivia 85, has pictures of Lobivia ferox flowers apparently red, purple, pink, or white in colour. It appears to be probable that the red flowering Lobivias seen by J.Carr in the Culpina basin could be Lobivia ferox.

It is also observed by J.Carr that both Parodia occulta and P.subterranea were seen growing together and were quite distinct from each other. Would these two have been seen on closely adjacent patches of ground, or even growing on the same patch of ground?

.....from J.Carr

Both these species of Parodia were growing together on a small patch of ground not much bigger than a tennis court in size. The longer spined P.occulta were about 2 to 3 inches high at the most, whilst the shorter spined P.subterranea were growing almost level with the surface of the shaley ground.

.....from T.Marshall

In the course of visiting south-east Bolivia, Parodia subterranea were found on fairly gently sloping hillsides, growing in cracks and crevices of the rocky outcrops of a vertical strata which was of a shaley nature, crumbling fairly readily. Despite their name, these Parodia do grow above ground level. When we climbed out of the Cinti valley and through the mountains, near San Pedro, as the mountainsides opened out to the left and right, the view opened out into the Culpina basin. We stopped where the shaley, vertically cleaved terrain looked ideal for Parodia occulta and we did indeed find it there. These Parodia were difficult to see as they grew pretty well level with the surface of the ground and possess a large tap root.

Occulta means unseen, so we prepared for a search in order to find these plants. As the bodies of these plants grew below or at ground level (depending on the season) they tend to be covered in the shaley detritus in which they grow. So the first recognition of them is either a spine poking out of the loose shale or - if you are extremely lucky - a flower. In cultivation these Parodia occulta grow more above ground level and so look more like P.subterranea. In fact I would go so far as to say that P.occulta is a form of P.subterranea which has adapted itself to its surroundings in habitat. Both sorts have flowers which range from orange to red, and shades between.

It was at Charcas, near Inca Huasi, that we found Lobvia chrysochete growing in company with P.subterranea. This Lobivia seems not as specific as to where it grows, as it can be seen growing in various substrates.

.....from H.Middleditch

After leaving the Culpina basin, the road closures forced J.Carr to take a diversion east from Padcoya, when Lobivia chrysochete and minutiflora were found. In Chileans No.65 there were various observations

regarding L.chrysochete, but how might this compare with L.minutiflora, which Rausch places as a variety of L.chrysochete?
.....from M.Lowry.

It was some years ago that I acquired some seed of supposedly L.minutiflora which had been collected by R.Kiesling and L.van de Hoeven to the east of the Abra Lizoite, in the course of their visit to Santa Victoria. However, when the germinated plants eventually grew to flowering size, these were typically the size of flowers to be seen on L.chrysochete, and also typical of that species was the quantity of quite long woolly hair on the flower tube. The flowers on L.minutiflora and L.chrysochete are totally different - the minutiflora is so named on account of having very small flowers which are rather like L.maximilliana in shape and size, with few hairs on the short, thick, flower tube, and a red flower which barely opens. On the other hand, L.chrysochete has big red, orange, or yellow flowers some 2 or 3 inches across, the buds and the flower tube being very woolly.
.....from T.Marshall.

In general the Lobivia chrysochete that I have seen in habitat are squat plants, wider than they are tall and with a fairly dense covering of short reflexed spines. The spines tend to partially obscure the body of the plant, but this varies from site to site - presumably due to exposure or genetic pool. Virtually always these L.chrysochete grow as a singular plant, only seeming to offset when damaged. They are never plentiful, always nearly a stones' throw or more away from each other. On different habitat trips, thus different weather timings, I have seen plants either flowering in December with flame coloured flowers of orange and red shades, or with fruit, the fruit interiors being sticky - the texture of slightly runny jam.

Vegetation at the Lobivia chrysochete locations seems fairly sparse and low growing. so that these Lobivias are fairly easy to spot from a distance., especially as adult plants can be up to a foot across. They seem to prefer to grow on gentle slopes within fairly stoney ground. I have found them occasionally on flat hilltop sites as well, again with a plentiful collection of stones and not much in the way of other vegetation. Those slopes which carry vegetation, such as Salvias and Baccharis seem usually to be almost certainly devoid of L.chrysochete, even though other factors are ideal.
.....from M.Lowry.

We did find L.minutiflora at 4394m when we were crossing the Sierra Santa Victoria, and again at 4380m not far away to the south of Viscachani. To the east of Padcoya we found both Lobivia chrysochete and L.minutiflora growing together, looking surprisingly similar in size, but on the L.minutiflora the spines were curved and tended to curve round the body whilst on L.chrysochete the spines tended to stand more outwards from the body of the plant.
.....from R.Hillmann

Going north from Culpina, towards Inca Huasi, we came across solitary plants of Lobivia chrysochete with larger flowers, some 6 to 7cm tall, orange or yellow in colour. Much further to the north, at the southern end of the Cerro Mandinga, we found more of these Lobivia near Ocuri where they were growing in company with only Tephrocactus bolivianus. These Lobivia grow up to 40cm across and have the appearance of the v.miniatiflora, but have extremely small flowers, only 1-2cm tall. Around Mariscal Braun these Lobivia are smaller - only up to 30cm across - but elongated, up to 40-50cm tall. Both sorts have the same small flower, like a L.maximilliana. At both places, plants which have had their centre destroyed by animals or stones can produce offsets.
.....from J.de Vries.

The Lobivia found on the Cerro Mandinga and Cerro Cantar Gallo, near Zudanez, were not to be seen in any great numbers. They grew up to about 50cm tall and offset, the larger plants with half a dozen or more offsets. Higher up on the Cerro Mandinga, even approaching 3900m, we found some more of these large plants of Lobivia chrysochete, which are somewhat smaller there, but even then up to the size of a bucket. They were mostly to be found on stony hillsides virtually devoid of any other vegetation. The identification as L.chrysochete was confirmed by Prof. Diers. But we saw little or nothing in the way of flowers so that I am not sure if they are the variety minutiflora. My own plant of VZ 323 from Cerro Mandinga flowered early in May at the same time as all the L.chryochete that I have from other collectors. There were no L.cinnabarina in flower at that time, they come into flower later in the Spring, into summer. Which shows that these Lobivia from Cerro Mandinga are chrysochete and not cinnabarina.

There were very few young plants of L.chrysochete to be seen on the Cerro Mandinga. When going down the south side of the Cerro Mandinga we did see some Helianthocereus bertramianus, but again only few in number.
.....from L.Diers

When I was first informed about these discoveries of some Lobivia plants in the Cord. Mandinga, I did not believe that they could belong to Lobivia chrysochete. But my questions with regard to the size and habit of the plant, as well as their flowers, fruit and seed, have led me to the opinion that these plants really do belong to the group of Lobivia chrysochete. At somewhat lower altitudes, even down to 2600m, in more or less drier places, the plants are smaller; they never show the giant dimensions but in all other features they are identical.

They all have no tap roots whereas Lobivia cinnabarina and it relatives do have a tap root, as well as having rather broad flowers up to three inches in diameter. On L.cinnabarina the fruit is rather small, when ripe it is dry to nearly dry internally, but never with a viscous filling. The larger plants may have a diameter of 15cm, rarely a little bit more.

.....from R.Hillmann.

The plants found on Cerro Mandinga by J.d.Vries which grow there without the company of any other cacti, were first called Lobivia cinnabarina v.gigantea by Rausch, but the fact is that these plants have L.chrysochete seeds. Again the clustering plants seen here will have had their centre damaged

FINDING BUININGIA IN BRAZIL. From R.Gillman

Our visit to Brazil was made in June of 2008 during which we were able to visit three locations not far from the Rio Jequitinhonha where we came across plants of Buiningia. It was not far from Pedra Azul where we first found these plants, growing on a slope leading to a domed outcrop of solid rock, probably granitic, that would have been about the size of three or more football pitches, in the midst of scrubland with some trees, which looked like a tropical forest. The rock carried patches of lichen where it was exposed, and some gravel and sand in small depressions. It was in the patches of gravel and soil and on the edges of the rock bordering the scrubland where the Buiningia were growing, in company with a few scattered dwarf shrubs, with much of the hillside quite bare of vegetation. The Buiningia could be seen growing here and there, mostly forming colonies which ranged from a few plants to well over fifty specimens in a group of about 2m across, some of these groups being within a few metres of each other.

These Buiningias were rarely taller than about 8 or 9 inches high. Many of them carried a cephalium which occupied up to six inches at the top of the plant, even some globular plants about 4 inches across having small cephalia. On many of the taller plants with a cephalium of up to possibly six inches in height, the lower part was almost black in colour. The cephalium was formed of short, white wool with numerous slender, projecting bristly spines of yellow colour. This was the only place where I saw a flower on a Buiningia, close to the crown, but some of them were in fruit. The fruit was pinky-red or bright red in colour, about 15mm long and 8mm in diameter. Some plants were clearly forming offsets at the base.

Leaving the site near Pedra Azul we drove to the west, and when we were about a 30 minute drive before Salinas, we came across another spot where Buiningia were growing. This was also a rocky outcrop, similar in many respects - such as being surrounded by scrub forest - to that at Pedra Azul. It was an almost bare slope of rock, but from the crown of the slope we could see another area of exposed rock, which might possibly have been around a quarter of a mile or more long, more or less level, occupyimg the crown of an inselberg. Almost the whole of this area appeared to be of apparently solid rock and was devoid of vegetation, other than in a few depressions where gravel and soil had gathered. But where we walked on to this rocky area, where the rock strata dipped under the surrounding scrub forest, and at other points which were visible along the edge of the bare rock, there were intermittent patches of varying width between the rock and the scrub supporting shorter bushes nearer the rock. Where the transition vegetation gave way to solid rock, was where the Buiningia grew, between loose stones, gravel, and soil, often quite close to bushes or even the odd low tree, in similar circmstances to those growing near Pedra Azul. As far as I could see, not only was the great area of solid rock mostly devoid of other vegetation, but it did not seem to support many Buiningia either, possibly because of the smoothness of the rock. These Buiningia were much taller than those seen near Pedra Azul, some of them up to two feet in height. Some of these Buiningia grew vertical, some grew at an inclination away fron the vertical, others had stems adopting a curving stance. One or two, again, were seen with offsets at the base of the plant and one of them had an offset from the very bottom of the cephalium, but that was the only one of that nature that I saw.

As a generality, the cephalia had a V shape at their lowest point and above that they got wider as the plant got older, except that some did show signs of becoming narrower before widening out again later - possibly reflecting years of poor growth? Most, but not all, of the cephalia faced to the north, i.e. towards the sun at midday. Again we found a few fruits, more or less identical in shape and colour to those seen on the v.brevicylindrica. Because the plants here were taller and the cephalium again started a few inches from the base of the stem, there was a considerable length of the cephalium that was blackish in colour.

A few days later we were near to Itaobim when we came across another rock outcrop where this time we found Buiningia aurea. Here the scrubland was less dense in the vicinity, the level ground at the foot of the rock slope having a scattering of short trees, and patches with bushes, but mostly with a covering of low growing shrubs. Some of the slope was devoid of vegetation, just exposed bare rock as at the site of v.elongata, but here and there we could see groups of Buiningia, some with perhaps only a dozen plants, or even just one or two, some patches perhaps 2m or more across with dozens of plants, growing amongst broken stone covering the solid rock, or in patches of gravel and soil which may have been quite shallow. There were columnar cacti, most likely Pilosocereus gounelli, growing where the foot of the rock slope met the level ground, but at occasional places these plants were very obvious, growing on what was mostly bare rocky slope, some of them up to about 8 feet in height, some solitary, others with many stems. Pilosocereus magnificus was also seen growing there. Taking a closer look at some of the groups of Buiningia, quite a lot of the stems of about 8 or 9 inches in height still lacked any cephalium. So the stems with a cephalium were taller than those near Pedra Azul and the cephalia shorter than on those seen to the east of Salinas.

We also saw some Buiningia here which were producing offsets from what appeared to be plants that had lost their crowns. They were of a bluish green or bright green body colour, and compared with the vast majority of the other Buinigia here, the apex of the ribs was sharper. The spines were a reddish-brown in colour, not yellow.

Buiningia aurea
v. brevicylindrica

Pedra Azul

Buiningia aurea
v. elongata

East of Salinas

Buiningia aurea

West of Itoabim

Buiningia

Photos: R. Gillman

AT THE HABITAT LOCATION OF BUININGIA BREVICYLINDRICA v.ELONGATA.
By P.Braun. Succulenta 1.60.1981

In Salinas, a small village in the north of Minas Gerais, Brazil, we were hospitably welcomed. This settlement, according to the indigenous inhabitants, had until recently been completely cut off from the outside world. Catastrophic rainfalls in the Spring had left the whole stretch under water, and that we saw very clearly from the poor condition of the roads.

Januaria, a town on the Rio San Francisco, would itself have stood some 90% under water. With this picture the reader must remember that in these rain-rich, soaked conditions, a considerable number of cacti are to be found. During the evening meal, in a "Churruscana", a village local told us about a place where Cabra de Frea - or Melocactus - could be found. Upon our asking, he took us the following morning to a place, a couple of streets away, where he let us see a wall, next to a village school. On this wall we saw at first only an enormous branch of a Hylocereus, but on closer inspection, it was also evident that Melocacti with cephaliums were growing on top of the wall, neatly side by side with one another.

These Melocactus must therefore also occur in the surrounding area. Very quickly we found somebody who would take us to the right place. Thus we drove for 40km along the most abominable set of forest tracks and so traversed the countryside, whilst we had great difficulty in following the fast driving local resident with his fantastic off-road vehicle to the place known to him. Not infrequently our friend drove at 80 -100 km.p.h over the dirt road. It was a fiendish ride. The winding, single way sandy roads were continually narrowing and in a rocky, wet spot we had to bring our vehicle to a stop. But then we were only a couple of paces away from the sought-for habitat location. Out of the green woodland vegetation in the valley there arose unexpectedly a bare, white-glossy dome-like granite rock. Mostly at the foot of these rocks, between grass and under bushes, we found Melocactus H/B 14, growing into very large grey-green plants, which at a distance could possibly be related to M.lessenlinkianus. But however the most excitement was brought about by plants which we had not really expected to find there - wonderfully fine golden yellow spined Buiningias. Although it was soon apparent that we were dealing here with Buiningia brevicylindrica v.elongata, for the plants reached a huge size, in contrast with all other Buiningias.

Buining wrote in his description of this plant that they could be up to 62cm high. At this habitat location, the plants were really more than a metre tall. Perhaps this phenomena went together with the very obvious humidity. In contrast to the Melocactus, we found the Buiningias mostly on the tops of granite rocks. Because the ground is quite bare, they had only little foothold there, so that as they grow older they fall down. Not infrequently the plants are loosened out of the ground by their own weight, but also by the heavy rainfall. Countless plants lay here and there, spread over the rocks, as if somebody had pulled them up only to fling them down again. After some time these plants would be washed off the rocks by the rain and then take root again at the foot of the rocks between gravel and bushes.

This variety only starts to form a cephalium when at a height of 15 - 20cm, and that is often splendidly woolly. The older it grows it becomes interwoven in increasing measure with thin, elastic, yellow bristly hairs. To begin with, the cephalium embraces only a few ribs, but in old and tall plants it can occupy more than half the diameter of the body. In habitat, this variety resembles the Type. Also the flowers are yellowish-green, and small, while the fruits are a little longer, of a red colour.

As already mentioned, the habitat location is not the same one as Horst and Buining had visited, because here grows, next to the already mentioned species, two still unknown Cerei: one a small growing Pseudopilosocereus H/B 12 and also another sort, of which it is still not clear to which genus it belongs, because the stems did not display any patch of wool, nor flowers, and no seed. Growing there at the same time there was an Opuntia and a Cereus species. In this cactus paradise still grew hundreds of specimens of this elegant and stately Buiningia, but only this habitat is to a large extent threatened, because even during our stay men began to quarry the granite rock. If this continues further, then only two or three years will pass before these rocks and the cacti species appearing on them will have disappeared. It is to be hoped that in the expances of this area that more similar habitats will become known in future.

.....from J.Hughes

It was rather refreshing to receive a query about Buiningia as many botanists lump these plants under the genus Coleocephalocereus which has precedence. To me, the genus Buiningia refers to a group of plants with spherical to short columnar stems, coming from the north of the Brazilian state of Minas Gerais, with the epi-centre being Pedra Azul. [For locations, see the Chileans' Eastern Brazil map]. I have made two trips to the area, both in late January to early February.

After spending three weeks in the south of Minas Gerais in 2002, the first Buiningia localities that I visited were close to Itaobim. In addition to the information from M.Machado about the plants that grew in this area, he had also given me two locations not far from Itaobim. This town is a rather nondescript place, on the main road running north from Belo Horizonte to Vitoria da Conquista. Leaving the town and taking the road to Itatim, the first site was difficult to spot, as it was a quartzite pavement below the road. The area was quite wet as it had rained overnight. These rocks are a haven for cacti as, during the rainy season, in the summer, the majority of the water runs away quickly. The Buiningias grow on these rocks but not in the surrouding scrubby vegetation. Even though the bulk of the water would drain away quickly, there were signs that there might be quite significant rainfall at certain times of the year as there were areas of algae growth. These appear darker and are always to be avoided, as they are very slippy when wet.

There were good plants of Buiningia aurea growing here, some of which were in flower. These appeared to be flowers 'hanging on' after having been at their peak during the night. This is the location for a form of

Melocactus ernestii v.azulensis known as multiceps. The plants of this Melocactus on this site had cephalia that divided into as many as three segments. It was commented by M.Machado that he had seen up to eleven cephalia on a single plant at this site - but that was before most of the plants had been removed by collectors. It was obviously a genetic trait, and not as a result of insect damage. I limited my collection to seeds, In late 2003, I revisited this site in the early afternoon so it was too late to see the Buiningia flowers. This time the slope was dry and the plants were bathed in sunshine.

The second site for the Buiningia was on a rounded quartz hill near to Itatim, where the vegetation was also very lush. The sky was darkly overcast and threatening rain. The star plant at this site was Buiningia purpurea, only known from this location. On my first visit around mid-morning, a few of these plants were in flower, with their typical purple-red flowers. The proportion of plants actually flowering was quite small and, as there were considerably more seedpods, I formed the impression that I had missed the main flowering season. The spination on these Buiningia is very variable in colour. I had originally thought that there were two species, as there were both yellowy-orange spined plants and deep brown spined ones. When I saw that flower colour was independent of spine colour, I soon changed my mind.

When I returned to this site in January of 2003, we arrived mid-afternoon and I was able to see the fruit. But unfortunately I could find no flowers on any of the plants which was disappointing as, being day flowering, I had hoped to find at least a few plants in flower.

Also in January of 2003 we made a trip to Pedra Azul. After about 2km. we turned off to a side road to see a most beautiful form of the blue Pilosocereus pachycladus, with fewer ribs and more wool than normal, which was originally described under the name of P.cenepequei. Then we took a dirt track that led to the Fazenda da Pedra de Cabeca Torta - the farm of the twisted head's stone. The whole area has the most beautiful stone outcrops with steep sides and rounded tops. Every five minutes or so there was a gate to be opened and closed. After five kms. or so, when it was getting on for mid-morning, we stopped at the base of one of the less steep inselbergs. Here we climbed through the most beautiful colony of Buiningia aurea brevicylindrica, which were in full flower. This was the first time that my travelling companion, a resident of Brazil, had seen a whole population of these plants in flower. There were also magnificent plants of Pilosocereus multicostatus, which still had flowers, although these were fading quickly in the heat of the day. Even at the time of our visit, the flowers on the Buiningias still appeared to be fully open.

A final stop was made at a very sharply sloping hillside where we were pleased to find a further form of Buiningia aurea which equated to the form 'elongata', but I do not remember any of the plants being in flower.

A number of queries have been put to my travelling companion about Buiningia, as follows.

With the exception of B.purpurea, are all other species of Buiningia night-flowering? ... The flowers of B.purpurea open in the morning and close in the early afternoon. The B.aurea opens its flowers at night - usually very late by about 10 or 12 p.m. - and the flowers remain open until the next morning, closing before noon. The other Coloeocepalocereus species have nocturnal flowers.

What is the principal pollinator? .... For Buiningia purpurea, humming birds. For B.aurea, humming birds and perhaps nocturnal moths. The other Coleocephalocereus are pollinated by bats and maybe by moths.

What is the main flowering season? .... I have visited the B.purpurea site a number of times at different periods of the year and the main flowering season for this species is October - November. However, the flowering season does last until early February. Buiningia aurea is found in flower during the same period, but I never saw many of these plants in flower at any one time, that is until our visit to the site of B.brevicylindrica in January. It seems that this species flowers with more abundance after some rainy days, which was the case during the time of our visit.

Is B.purpurea day flowering and does it have a different pollinator? Its colour and time of flowering would seem to indicate humming bird pollination. .... Yes, it is a day-flowering species - the flowers open in the morning closing in the afternoon. Humming birds are the main pollinators. The B.aurea also seems to be pollinated by humming birds but moths cannot be ruled out because the flowers are open at night. The flowers are too small for bats.

.....from C.Wolters, Succulenta 70.6.1991

A tiny hamlet called Jequitinhonha becomes our overnight quarters, near the river of the same name, which we would like to follow for a short while. Originally it was the intention to follow this mighty river to its mouth into the ocean, but we have decided that tomorrow we will do quite the opposite, because from what we have seen of it recently, there will be no interesting discoveries.

On the way from Divisa Alegre towards Medina, we came across B.brevicylindrica on huge smooth slopes of rock. This species spreads by making numerous offsets so it is to be found in very large clumps. The spines are very yellow and the cephalium is angled to the north-west, with many golden-yellow bristles which later become brownish. Pilosocereus multicostatus grew nearby and some tall Brasilicereus.

A few kms before reaching Itinga, we came across B.purpurea growing on a grey granite hillside. Not easy to find as it grows in light scrub. The spination is copper-red and the cephalium faces in a westerly direction. We did see one specimen that had reached a height of 80cm without branching.

Next morning the sky looked different - it was overcast, but by midday the sun broke through once again.

.....from T.Lavender

My plant of Buiningia aurea was obtained from Holly Gate as an imported specimen; it was about six inches high, somewhat elongated globular in shape. It already had a cephalium when we purchased it; this was made up of a cushiony mass of whitish wool, rather more creamy white in the lower part. It just covered the growing point and occupied about a quarter of the circumference of the plant for some two inches down from the crown. The edge of the cephalium was very abrupt, looking almost like a neat pad of cotton wool stuck on to the plant with not a great many odd hairs pointing out from the margin of the cephalium. It gave the

impression that the cephalium hairs were curled back over on to themselves, and so were much longer than the actual thickness of the cephalium.

We grew the plant in the little lean-to greenhouse which we run at a temperature of between 55°F to 60°F. It was already well established and showing signs of growth before the end of the first season. We had only been growing the plant for about a year when it flowered and then set fruit of its own accord. We had a look at the plant one breakfast time in early June and there seemed to be a bit of an unusual bulge in the cephalium wool. When the wool was parted it was possible to see that a bud had developed within the cephalium wool. It was a bright sunny day and by lunchtime there were two bright green buds projecting about 3mm above the cephalium wool. At 2p.m. there was a stigma protruding through the unopened petals of both buds. By tea time the petals had opened above the wool on both flowers. The flowers were still open at breakfast time the following morning but by then the stigma was not protruding above the top of the flower; so the flower petals must have grown the previous evening and overtaken the stigma. It was closed by midday, so it did not last a full 24 hours.

A fortnight later, a third flower appeared. The lower edge of the cephalium is not straight - it slopes from left to right. Immediately below this edge are a spiral line of areoles, one on each rib; it rather seemed as if the all three flowers were growing along another one of these spirals, within the cephalium, with flowers on adjacent ribs. There was no sign at all of the this last flower early in the morning, but it was open by tea time. It was overcast the whole of the day, but quite warm. This time the flower was crossed with a Melocactus and set fruit once more.

.....from C.Sherrah

It was in 1999 that I purchased a 2-3 year old plant of Buiningia brevicylindrica v.longispina. It would be about 11-12 years old when it first flowered, with a flower of some 3mm in diameter, but the lower 11mm of the flower is buried in the cephalium.

.....from M.Madders.

In 2005 I obtained some seed of Buiningia aurea HU 116 from Köhres, which I sowed in my usual mix of three parts sieved JI No.3 compost to 1 part of horticultural coarse gravel, after watering it well with boiled and cooled rainwater. The compost was not sterilised in any way. The seed was sown on the surface, lightly pressed into the compost and the pot rim was immediately covered with clingfilm, held in place by an elastic band. The pot was then put, with others, on the propagator base, set at 20°C in the daytime and 12°C at night. All seed pots are kept in deep shade during germinaton and for the first year. The seed was sown in February and every couple of weeks in the summer the clingfilm was removed to check for drying out and, when necessary, to add boiled rainwater. If the soil is compacted on the surface I will loosen it with a pair of tweezers, taking care not to disturb the seedlings. My seedlings are never given any supplimentary feed. My two Buiningia plants are not quick growing, they are now in 2.5 inch pots and I am looking forward to seeing them produce their cephalia.

.....from R.Zahra

Our growing season here in Malta is very long. Mature plants can start growing in March and not stop until October or November. By the end of December, the outside temperature is 16°C by day and it can go down to 5°C at night. Without artificial heat, the temperature inside the greenhouse can be between 5° and 8°C higher than outside in the open.

My Buiningia are kept on a bench in the greenhouse along with all my other cacti. I have plants of Buiningia aurea and B.brevicylindrica v.longispina HU 167a, which are of flowering size. The B.aurea now has offsets growing from the base. Until the cephalium appeared, both plants were globular, but once the cephalium appeared, they started to grow taller. The B.aurea was five years old and about 7.5cm tall and wide when it started to produce a cephalium, which has wool of a pale yellowish colour, but the new growth with the cephalium is much thinner than the basal part of the plant. The flowers are small, only 8 or 10mm in diameter, and since they are the same colour as the cephalium you will hardly notice them, My other Buiningia is much thinner, being only about 5cm in diameter and there is no change in the diameter between the basal part and that with the cephalium. This plant has a white woolly cephalium with reddish bristles.

GYMNOCALYCIUM ERINACEUM var. PAUCISQUAMOSUM. By J.Piltz.
"Gymnos" 11 (21) 1994

On the levels of the longitudinal valleys and on the sides of the mountains of the Sierra Cordoba there may be seen a more or less distinctive Chaco mountain woodland. In this area, and above all in the northern parts of Prov. Cordoba, there occurs a succession of Monte, Chaco, and Espinal vegetation which frequently blends one into the other. At higher levels up to about 1000m the Chaco mountain woodland gradually gives way to bush and grass vegetation, into which the northern Sierra Chica element of the Espinal intrudes from the east. That particular transition vegetation formation was, from my observations, favoured by Gymnocalycium capillaense anongst others. In the wider surroundings of Ongamira and at the foot of the Cerro Aspero, there existed this open mountain bush vegetation.

It was here that we searched for G.capillaense. Very frequently in this area there may be seen a form which was described by Dolz in 1943 as G.deezianum. Surprising, however, is the occurrence of a further form with the appearance of one of the smaller Gymnos, which in some places grows sympatric with G.capillaense and in the resting season in habitat is, in superficial respects, scarcely to be distinguished from that species.

Certainly noticeable for the time of year were the early signs of buds - seen in August 1987. It was also obvious that these plants could be expected to be in a degree of relationship with G.bruchii, on account of the

very fine spination and the early onset of bud formation, although the body was considerably larger, the ribs broader, and the number of spines less. Also the nature of the spines i.e. their disposition and attitude from the body, does not fit in with what was generally known as G.bruchii.

In cultivation the plants proved themselves to be early flowerers, their flowering season coinciding with that of G.bruchii, G.erinaceum, and G.andreae pro parte. The flowers are a deep rose color, to some extent dioceous like G.bruchii, whereas on the other hand the pericarpel is very long, only somewhat sparsely scaled. In addition the pale carmine red colour of the inner wall of the receptacle as well as the shape of the fruit and the more or less irregular bristly spine formation indicates a relationship closer to G.erinaceum.

Differing from these plants is the new G.erinaceum v.paucisquamosum on account of the broader and flatter ribs, by the greater areole spacing, by the larger body with at the same time a fewer number of ribs and by the rose coloured and more slender flower.

Although the position of G.erinaceum within the genus is still not quite clear, the new relation will be placed as a variety of it. The home of this variety is near Ongamira in the Sierra Chica, prov. Cordoba, at about 1000m altitude. The Holotype has been deposited at Utrecht University under the number P.400/3.

.....from H.Middleditch

Comparing the photograph of the flower section in the first description of G.erinaceum by J.Lambert with the drawing of the flower section in the first description of the v.paucisquamosum by J.Piltz, the two are virtually identical. In both flower sections the ovary is almost cylindrical, three or four times taller than broad. It would appear that a red flower and the fewer scales on the flower tube - hence the paucisquamosum - are the floral differences between the species and the variety.

.....from M.Tvrdik

Plants of G.erinaceum v.paucisquamosum which we found in habitat - for example, in the vicinity of Museo Fernando Fader - are very difficult to distinguish from G.robustum/leptanthemum. But there were no flowers to be seen there on these plants.

.....from G.R.Allcock

There is one big puzzle - why did Piltz link his v.paucisquamosum to Lambert's erinaceum? I see no logic at all in that linkage. The two look so very different. The drawing on the cover of the "Gymnos" in which Piltz described his v. paucisquamosum depicts a sort of twisted, bent, and kinked set of radial spines more or less curving back against the body of the plant.

.....from H.Middleditch.

Away from the crown, the spination on the body of the v.paucisqamosum appears to be quite pectinate, as opposed to the projecting spination which seems to be characteristic of G.erinaceum. Possibly somewhat similar to the appearance of the body and spines on G.amerhauseri, gaponii, and papschii?

.....from L.Bercht.

There is a growing body of opinion that the Piltz v.paucisquamosum is probably G.amerhauseri.

.....from H.Till.

As far as G.erinaceum v. paucisquamosum is concerned, I can assure you that any opinion that this is a separate species from G.erinaceum is - excuse the crude words - complete nonsense. I have visited J.Piltz and he showed me his G.erinaceum v. paucisquamosum. This is a typical G.erinaceum with a longer pericarpel and fewer scales. The plants had been collected on the western slopes of the Sierra de Ischilin at a low elevation around Rio Pinto. I have found them there in company with F.Strigl. I am not so sure whether those plants will still be there as the Argentinians destroy a lot by construction of new roads.

.....from R.Stanik

During our visit to the Sierra Cordoba we travelled from Ischilin to Ongamira, along a dirt road, where we came across a Gymnocalycium which we originally recorded as G.erinaceum. but we now think that this is more probably G.amerhauseri.

.....from L.Bercht

This RS 1719 is a plant belonging to the G.amerhauseri complex. It has been known as G.erinaceum v.paucisuamosum but to me a better name would be G.amerhauseri v.paucisquamosum.

.....from G.Neuhuber

The RS 1719 seems to be a G.amerhauseri, which is to be found not only near Asconchinga.

.....from H.Till, "Gymnocalycium" 7.3.1994.

Some populations of G.amerhauseri are to be found in the north in the Sierra de Ischilin. Thus this species occurs in geographic proximity to G.erinaceum Lambert, which belongs to another goup which is not closely related.

GYMNOCALYCIUM AMERHAUSERI By H.Till From Gymnocalycium 7(3)1994

During our second trip to Argentina in October 1988, in the Sierra Chica my fellow traveller H.Amerhauser found a previously unknown Gymnocalycium when he was looking for G.bruchii and G.andreae. A slim, pale pink flower projected up out of a clump of dry grass, which came from a dark green, apparently flat plant which turned out, as we exposed and uprooted it, to be a huge misconception. The above-ground, flattened globular apex formed the top of a carrot-shaped body which terminated in some thin, and some stronger, roots. After a lengthy search, more of these plants were readily found. Almost invariably they stood solitary, fairly infrequently exposed, most of them being covered by dried grass or dry leaves. At first we could not relate these plants to any well-known forms originating from the Argentine province of Cordoba.

In the course of later field trips, some further populations were found in the mountains of the province Cordoba, partially well separated from one another. No connection with G.bruchii, G.andreae, or G.capillaense was established.

Regarding a comparison with G.baldianum, we had previously found that species three weeks earlier in the Cuesta Chilca in province Catamarca, growing under similar conditions. A later comparison with cultivated plants of G.baldianum strengthened our belief that the new form belonged to this family. In this respect, it stood out, amongst other facts, that the new form was always found in the vicinity of hill tops. It is a feature of several species in the baldianum group that these forms are mainly to be found growing at higher altitudes over several provinces. In the prov. Catamarca it is G.baldianum, in prov. La Rioja it is G.uebelmannianum, and finally in prov. Cordoba the current Taxon, which will be named after the discoverer, Helmut Amerhauser.

The distribution of this new species is to be found in the Sierra Chica between La Cumbre and Asconchinga as well as in the NE of the Sierra Grande. These plants grow mostly near hilltops at 1450-1600m altitude.

Gymnocalycium amerhauseri grows readily on south facing slopes, shaded between huge stones or boulders, in grass clumps or in cushions of dwarf herbs, where it can acquire an adequacy of readily available moisture. Most of them expose only the crown above ground and also this is often covered by grass or leaves. The greatest portion of the body is to be found below ground level, the long roots deep below ground.

In order to to further observations, plants of the Type population were sought at different times of the year. At the end of October, which is also the Argentine Spring, the G.amerhauseri was already in flower whilst other Gymnocalycium growing in the near and far surroundings were not in flower; for example, a population of bruchii displaying only a few young buds. At the beginning of February, all the plants of G.bruchii in the near and far surroundings, and other Gymnocalycium, were starting to stand in full bloom. On the other hand, G.amerhauseri had already finished flowering and only a few empty fruit were to be found. The plants themselves were scarcely visible in the newly greening hillsides, and difficult to find. So that G.amerhauseri can equally be described as a Spring flowerer, and already sets fruit in habitat when the other species of Gymnocalycium first stand at anthesis.

The flowers observed in October were of different lengths, always according to how deep the plants stood amongsy the clumps of grass. With those whose crown was exposed, or the plants were not deeply embedded in the hard ground, the flowers were somewhat shorter.

The flower colour is somewhat variable according to the age of the flower or to the weather conditions. The flowers which were creamy white, tinged with pale pink, with a pink throat, in cooler weather were slight-to-pale pink with a somewhat darker throat.

The plants, growing quickly from seed which had been harvested from various habitat plants, turned out to be fairly uniform and some of them flowered in two years. Four years later, these plants can scarcely be distinguished from those in their natural habitat.

[Fully detailed description of G.amerhauseri provided]

.....from H.Middleditch

Consulting the original description of G.amerhauseri in the Austrian Gymnocalcium Journal of 1994, the pictures taken both in habitat and in cultivation are of plants which display only radial spines that curve back against the body in the manner basically similar to the Piltz drawing of erinaceum v.paucisquamosum on the cover of “Gymnos” Nr.21, 11. 1994. In addition, the carrot shape body in that drawing with the lowermost carrot-shape portion evidently being a rootstock, with projecting rootlets, compares surpringly well with the “Gymnocalycium” picture of a plant of G.amerhauseri which has been unearthed in habitat.

.....from H.Till.

Gymnocalycium amerhauseri grows on the tops of the Sierra Chica, usually in soil which has accumulated between rocks where the taproots can penetrate. The flat bodies are hardly visible between the short grass. The slender pink to white flowers are visible from a distance during the main flowering season. The difference to the forms of G.erinaceum is quite striking.

A DAY IN THE FIELD IN ARGENTINA. By L.Bercht. From Gymnos 12.23.1995

On the evening of 4 December we found an overnight stopping place in Capilla del Monte in the mountainous part of Cordoba. On this day we had seen many fine plants along our route, which took us from La Cumbre towards Asconchinga and via Ongamira, to Capilla del Monte. It transpired later in cultivation that some of the populations of Gymnocalycium bruchii which we had come across had clear white flowers.

For the following day we had planned a route, but each evening we reviewed whether to follow that intention or whether to modify it. At home, we had of course consulted the map of Cordoba, but in the field we found that it could be really interesting so that more time was needed than we had thought. It was also difficult coming to terms with South American roads and finding the right one. Also I was not inclined to go climbing up rocky slopes. So the route for the next day was changed so that once again we went via Ongamira, then Ischilin, with the additional objective of steering towards Sierra de Macha and Sauce Punco, with an overnight stop in Dean Fumes. But things went rather differently, but not badly.

As usual, we got up at 6.45 a.m. for our trip, paid our bill, and declined breakfast. At seven, we set off. The weather was good, partly overcast, and not too warm, whilst the rain stayed two days ahead. The first part of our route was familiar from the previous day. Again we crossed the Sierra Chica over the Quebrada de la

Luna, and once again we searched here for the supposedly white-spined Gymnocalycium bruchii Rausch - but without success. Between stones and fairly well hidden under grass, we re-discovered a flat green Gymnocalycium LB 1123. Whether these plants were identical with the “Ongamira” plants remains to be seen until we can view them in flower.

The “Ongamira” plants were subsequently found in fruit by J.Piltz and subsequently described as G.erinaceum v. paucisquamosum Piltz. It was meant by Piltz that the Taxon was clearly related to G.erinaceum. I doubt that because, above all, of the flower characteristics. The ovary of the flower of G.erinaceum is not so long, but it was noticeable that it was thick. The flower of the “Ongamira” plant is also not so long. but slim. Still more important, in my opinion, is the colour and the structure of the flower. The flower petals in G.erinaceum are white to a dirty yellowish-white, which run down into orange-red below. The overall impression of the flower is also white with a red throat. The flower on the “Ongamira” plant, however, displays pale pink petals without a deepening or change of colour downwards. For me, the “Ongamira” plant is an inherently good species. Perhaps the plants from this location - as probably also the LB 1123, which have already flowered and display a long, narrow, white flower with a red throat - are a transition to G.erinaceum.

Ongamira is a place of importance for tourists. Above all it gives the impression, when one approaches it from the north, that it lies right in the centre of a landscape of quite huge boulders. This place is inhabited and visited by many people; very old archeological finds have been made here. Naturally one finds Gymnocalycium capillaense and forms of G.monvillei everywhere in the surroundings. Also similar is the identification of the plants that we found on the south side of the Cerro Poleyos. In addition, to the north of that elevation we found plants which still await identification. In my opinion, these are a form of G.mostii, but the ribs are certainly sharper.

The route that we wish to follow leads us to a fine church and then past the village of Ischilin. Leaving there, we intended going towards Avellaneda, but we had taken the wrong road and finally got our bearings as we arrived in Dean Fumes. The impression of this grey town is miserable and we were pleased to move on quickly without searching for an Hotel. After some driving round, we found the right road out of the town in the direction of the main road and Route 60. The intersection for the branch road to Sauce Punco was easily found.

In the Gymnocalycium literature, Sauce Punco is recorded as the Type location for G.erinaceum. As we looked along the roads around Sauce Punco, my spirits fell. On this mountainside, fairly thickly overgrown, where should I search for cacti? Then, on the east side of Sauce Punco, we saw a hill. Growing there besides very fine G.monvillei was a small Gymnocalycium, between blocks of granite. To me, it was not the species being searched for, but another member of the Ovatisemineae group. On the next day, as we once again drove round Sauce Punco, we found the real G.erinaceum on the hills behind the swimming baths.

At Villa Tulumba we set off to the south in the direction of Machas, which took us alongside the Sierra de Macha. The designation Sierra is rather exaggerated as it is barely 600m high. Still to the north of Sierra Macha we found the Gymnocalycium LB 1135 which is without doubt belonging to G.stellatum. These somewhat bluish plants grow in gravel, together with a form of Lobivia aurea LB 1136. A km further south, (near Ojo de Agua) we again found G.stellatum LB 1137 and a Gymnocalycium LB 1138 whose seed belonged to the Ovatisemineae group. These plants displayed short, appressed, mostly downward pointing spines. I still do not have a relationship for them, but they certainly do not belong to either G.erinaceum or G.capillaense, as it is very different from both of them. In the Sierra Macha we again found the LB 1138 Gymnocalycium, together with other plants that, after studying them at home, I would place in G.erinaceum.

By the village of Macha there grows Gymnocalycium LB 1141, which at first sight seems to be very similar to G.erinaceum. A large specimen, however, no longer displayed the typical spination and also the flower was markedly different. Further observations are necessary in order to be able to make statements regarding the relationships of all these plants in the Ovatisemineae group. A species of the genus Acanthocalycium grows together with LB 1141. The altitude was about 670m.

The earth road was very sandy and nowhere did we see another place where we could expect to find cacti. The roadsides were overgrown with low shrubs. On a small rise, the shrubs were somewhat more open and to my astonishment I saw some cacti there. The Gymnocalycium LB 1144 occurred here under the bushes, in the earth. Neither grass nor stones were to be seen. Many plants were dark green but others displayed a brown epidermis. Another form that we found here was from the G.stellatum group.

The road continued further over extremely flat and cultivated ground, to our next overnight stop at Villa de Totoral.

....and later, in 2010

Although it is some time since my article in the 1995 Gymnos Journal, it has still not been found possible to determine an acceptable identification for LB 1138 and 1141.

.....from H.Middleditch

It is quite clear that L.Bercht has reservations in regard to the placing of the variety paucisquamosum under the species name of erinaceum. This would hardly be in accord with the comment from H.Till. However, it appears that there are other reservations in regard to names that have been associated with Gymnocalycium erinaceum.

.....from R.Zahra

According to the G.Charles book, G.gaponii and G.paschii are the same as G.erinaceum. I find that even in cultivation G.gaponii remains very flat and has a carrot like portion of the body below ground, whilst my JL 40 G.erinaceum is more cylindrical. Their spines are also very different. The spines of G.erinaceum are yellowish

brown and stand out whilst those of G.gaponii are white and lie close to the body. There are quite a number of similar examples of such lumping in this book and I certainly do not agree with so much lumping.
.....from J.Lambert

I am indeed surprised that G Charles proposed to consider G.gaponii as a synonym of G.erinaceum. I met with both species in the field, respectively under my field numbers JL-40 and JL-417. However, the idea of any possible synonymy never did occur to me.
.....from P.Harper.

I am astonished at the way the G.Charles' book puts G.erinaceum, G.gaponii, and G.papschii into synonymy. Visually none of my plants of thse species are alike.
.....from H.Middleditch

The account of finding G.gaponii in the Sierra Cordoba was included in Chileans No.65, where possible associations with other Gymnocalycium species were considered. In the intervening four years, much more information has come to light which would point to possible affinities with quite different species. The habitat location lies immediately adjacent to that of G.papschii and the pictures taken in habitat of that species and of G.gaponii which appear in the Austrian "Gymnocalycium" articles, are remarkably similar.

The diagnosis of this G.gaponii states that it differs from G.taningaense by the partially subterranean, green body and also by the reddish throat to the flower. An accompanying picture of an uprooted plant in habitat shows that about a quarter of the height of the body has been above ground, the rest evidently having been below ground level. This is of very similar appearance to that of an unearthed plant in habitat of G.lukasikii which was inlcluded in Chileans No.66.
.....from M.Tvrdik.

Making a visit to the locality of Panalholma, we found G.parvulum growing in the grass on the outskirts of this market town, whilst in the town, more or less in the river bed, grows G.gaponii. Here, too, we did not see any flowers on either of these plants.
.....from L.Bercht

As to the suggestion that G.erinaceum is synonymous with G.papschii and G.gaponii, the erinaceum from the north of Cordoba have nothing whatever to do with either G.papschii or G.gaponii.
.....from M.Tvrdik.

In my view, G. papschii does not belong to the form circle around G.erinaceum, but rather to that round G.parvulum. The locality where this species may be found is difficult of access because of being a private road, which leads to the the La Constancia locality. At the same time this is the way to the highest part of the range Sierra de Comenchingones. Nevertheless we managed to get there. There are only a few plants here and they look like those in our collections here. The next nearest location of plants in this form circle is to the south of the Cerro Bola with its columnar G.parvulum, to the north of G.calochlorum in the Nono locality, where it grows alongside G.vatteri.
.....from H.Middleditch

One example of a number of plants of a similar name but of fairly divergent appearance may be found in the first description of G.papschii by H.Till. This includes a habitat picture of one of these plants which looks to me to be not greatly dissimilar to G.gaponii, or to G.amerhauseri, and another picture of plants which seem to be somewhat similar to G.calochlorum, and yet another picture of a plant which gives me the impression of being rather like the picture of G.erinaceum which accompanied the first description of this species by J.Lambert.
.....from G.Hole

I understand that H.Till travelled along the western foot of the Sierra Comenchingones, in the south of the Sierra Cordoba, there coming across the plants which are illustrated in the Austrian "Gymnocalycium" for 19(3)2001 in his article on G.papschii, where the pictured plants certainly do display considerable differences in their overall appearance.

The first illustrations of G.papschii in the Austrian Gymnocalycium article are of plants in habitat which appear to be growing in a flattened globular form, projecting distinctly less above ground than their diameter; they are from San Javier, and are what may be described as an andreae-like form. My own plant of G.papschii WP 105 from San Javier is an offset from an ex-habitat plant which was presented to me by H.Till during my visit to Austria. They have a large white flower.

The confusion with G.erinaceum may have originated from both G.papschii and G.erinaceum having flowers with a throat of a deep pink to red colour.
.....from L.Bercht

Unfortunately there has been some confusion with the pictures which are included in the Austrian Gymnocalycium issue No.14 of 2001, concerned with G.papschii. The initial habitat pictures which display a plant with a flattened globular body that rises only a short way above ground level, do match the Latin and the German diagnoses for this species in the text. The further pictures which are somewhat similar to G.bruchii or G.calochlorum are not G.papschii at all.
.....from P.Crewe.

The JPR field list does include two entries for G.bruchii found in this area - JPR 92-109/259 from Nina Paula and JPR 92-110.261 from Pampa de Achala.
.....from H.Middleditch

These locations are well to the south of other available recorded sightings of G.bruchii, but lie close to the habitat area for G.gaponii rather than close to that of G.papschii. However, the pictures of G.papschii in cultivation in that "Gymnocalycium" Journal would appear to display flowers with a fairly elongated pericarpel, whereas the flowers reportedly seen on G.bruchii, and so illustrated in the article on this species in

“Gymnocalycium” 16.2.2003, possess a much shorter pericarpel. Hence it seems to be more appropriate to compare the pictures of G.papschii which are questioned by L.Bercht, to calochlorum rather than to bruchii.

.....from H.Till

Gymnocalycium papschii has caused numerous debates due to insufficient knowledge of the Taxon by the discussing parties. When Papsch gave me the plants to be used for the description of this new species, I had thought that it could be two different taxa due to the morphological differences. However, Papsch assured me that all plants came from the same locality and would represent juvenile and adult forms respectively. During the following years, the members of our group have investigated the nearer as well as the more distant areas and have discovered another two populations with mainly juvenile plants and only a few adults. In 1990, together with my son Walter, I found the nearest relative, the southernmost form of G.parvulum at Nina Paula at the base of the Sierra Grande..

GYMNOCALYCIUM PAPSCHII. By H.Till From Gymnocalycium 14 (3) 2001

After several weeks spent studying the Gymnocalycium in Patagonia in the Spring of 1989, W.Papsch and his travelling companion G.Hold reached the mountains of the Argentine provinces of San Luis and Cordoba. In particular the Sierra Comenchingones which rises to over 2000m altitude and forms the border between these two provinces. Driving north from the border town of Achiras at the southern end of the Sierra Comenchingones, with frequent sightings of the form-rich G.monvillei, they finally reached San Javier, a small place betwen Merlo and Nono (the Type locality for G.vatteri). San Javier is the starting point for exploring these mountains up to the peak, the Cerro Champaqui.

Since the Sierra Comenchingones had previously been rarely visited by cactus collectors, they used this opportunity to be on the lookout for Gymnocalycium and if possible to reach the 2700m high Cerro Champaqui. On a kind of road quite difficult for a Landrover they reached 1,000m altitude where a closed gate then barred further progress. On the way, at the foot of the climb, many populations of G.ochoterenai v.vatteri and later a fine form of Echinopsis aurea were seen.

From the gate they proceeded on foot further up the mountainside, along a narrow climbing path through open stands of Larrea and Mimosa, which were rising up through clumps of dried grass. Between such grass clumps, in fine sandy ground and between stones, stood various large individual Gymnocalycium, which were reminiscent on the one hand of G.bruchii and on the other of G.parvulum, which however could be allied to one or the other species. They were mainly solitary plants even though now and again they grew together in small groups. Without flowers they were difficult to see in the dried grass and only thanks to some already opened buds could the small plants be detected. Finally there were also some older specimens growing further above ground which all had one mostly twisting central spine in each areole. They received the field number WP 89-83/11.

At about 1500m altitude the ground was formed of rubble covered slopes with Larrea bushes, in which numerous stands of G.monvillei, Acanthocalycium violaceum, Trichocereus sp., and various Opuntia were to be seen. At first sight, as indicated above, one thought of G.bruchii, but on account of the lack of offsets they differed from the elongated globular to short columnar growing plants of G.bruchii, which often grew into cushion like clumps - and also from the pink throat of this new discovery it appeared that both Taxa did not belong together.

In 1926, in the Sierra Chica near La Falda, C.Osten collected the G.bruchii which was described in Zeitschrift fur Sukkulentenkunde. The illustration there, which he himself provided, was of offsetting plants up to 65mm long - inclusive of the underground part of the body - and with flowers having a pale throat, typical of G.bruchii. In 1973, W.Simon (in K.u.a.S. 24/87) wrote about a G.bruchii v.spinossisimum growing 150mm tall and 70mm thick with 15 sideways offsets and 3-5 centrally arranged, 20mm long spines and 45mm long pale pink flowers without a centre stripe. However, this offset from the body of the plant like other forms of G.bruchii such as f.fraternum, f.albispinum, f.intermedium, and f.enorme - all nomina nuda.

The lack of offsetting from the body of the plants and the elongated flowers with a dark throat are acordingly the principal feature compared with all forms of G.bruchii.

(Fully detailed description provided)

.....from H.Middleditch

In the text description of G.papschii by H.Till, it is stated that, in habitat, more than two-thirds of the body is often sunk into the ground. No illustration of an uprooted habitat plant is provided, but this description of a largely subterranean body is a close match for the G.gaponii described in the Austrian Gymnocalycium 14(3)2001 as having only about a quarter of the body above ground level, this being well illustrated there by a picture of an uprooted habitat plant. The recorded habitat locations for G.gaponii and G.papschii each occupy a relatively small area immediately adjacent to each other on the western flanks of the south of the Sierra Cordoba, which is in the lee of the Sierra Cordoba for the rain-bearing winds which come from the Atlantic. On this acount, cloud cover may, on average, be rather less than for much of the rest of the Sierra Cordoba, so that plants could be somewhat more exposed to direct sunlight. This may cause these two species to have much of their body underground to cope with the arid conditions of their habitat. Conditions in cultivation are likely to be quite different so that this might lead to the bodies of G.papschii being mostly above soil level, as in the pictures in the Austrian Journal of these plants in cultivation.

The Latin diagnosis for G.papschii in the Austrian Gymnocalycium Journal states that the body is similar to G.parvulum “but three or four times taller”. The 1905 Spegazzini description of his Echinocactus platensis


SIERRA CORDOBA
0 kilometres 50
65°E
64°
San Francisco de Chanar
San Miguel
San Luis
San Pedro Norte
Quilino
SIERRA TULUMBA
Agua del Rodeo
Dean Funes
Tulumba
500m
Sauce Punco
Los Chanares
Salinas Grandes
Sierra Masa
Los Tartagos
Ischilin
Macha
Ojo de Agua
Serrezuela
Copacabana
Sierra
Los Coquitos
Cruz del Eje
La Higuerita
Ongamira
Sarmiento
San Marcos
Cerro Uritorco
Todos Los Santos
El Zapato
Capilla del monte
Villa de Soto
El Sauce
Los Patayes
La Puerta
Los Cocos
Tres Arboles
Agua Colorada
Asconchinga
La Cumbre
SIERRA DE GUASAPAMPA
Cienaga del Coro
La Higuera
Cruz de Caña
Perchel
Chica
Sauce Chico
Mesa de Mariano
Characato
La Falda
500m
Puerta Del Duranzo
La Estancia
Olaen
Rio Ceballos
San Carlos
Sierra
Rio San Gregorio
Cuatro Esquinas
Pampa San Luis
Cosquin
La Argentina
Salsacate
Tala Cañada
Cuchilla Nevada
Bialet Masse
Villa Alende
La Mudana
Taninga
Hollada
San Roque
Los Tuneles
San Geronimo
Tanti
Cassaffousth
Villa Viso
Las Palmas
Los Gigantes
Villa Carlos Paz
Rio Primero
CORDOBA
La Sierrita
Lujan
Pampa de Pocho
Icho Cruz
Ambul
Pampa de Achala
Copina
Las Jarillas
Villa Rafael Benegas
Observatory
Sierra Pocho
El Mirador
Cumbre
El Condor
Bosque Alegre
Panaholma
Grande
Alta Gracia
Rio Segundo
San Lorenzo
Villa Cura Brochero
Mina Clavero
Niña Paula
Villa La Serrenita
Anizacate
San Sebastian
Los Quebrachos
Villa Ciudad de America
Cuesta de Aguilar
Altautina
Nono
500m
Las Rabonas
Villa Berna
Los Reartes
Achala
San Pedro
Las Rosas
Gnrl Belgrano
CORDOBA
SAN LUIS
Villa Dolores
Champaqui
Calmayo
Comechingones
Sierra
Calamuchita
San Javier
Yacanto de Calamucita
El Durazno
La Orillada
Rio Terrero
Luyuba
El Hongo
Loma Bola
Quilinzino
Cordoba

v.parvula, later his renaming as G.parvulum, states that the body is “small and high”. The combination of these two statements would suggest that G.papschii could grow to an almost elongated form.
.....from G.Hole

One of my G.papschii is from Loma Bola, which has grown to about 8cm tall and about 3cm in diameter, so having a similar elongate form to the cultivated plants of G.papschii illustrated in the Austrian article. They have a superficial resemblance to G.bruchii. My plant of G.papschii has a fruit which is about 20mm tall and also 20mm thick at the centre, curving down to about 8mm thick at the base and top. This compares with the fruit on a typical G.bruchii which will be nearly globular, about 7mm long and 5mm thick.
.....from H.Middleditch

It may be advisable to bear in mind that the size of a ripe fruit is rather dependant upon the extent to which the ovules have been pollinated.
.....from R.Coward

I have grown some G.papschii from seed from the BCSS which are now about 20mm in diameter but at present - in November - they are no more than 5mm above the soil level. I can remember that when I transplanted them they had a massive thick root which is why I put them all into a 130mm square pot which is 130mm deep. They look rather like the plants that resemble G.calochlorum in the pictures in the Austrian publication. I would certainly not have said that they were probably a form of G.bruchii.
.....from R.Crook

My young seed-grown plants of G.papschii LF 157 from Loma Bola have a subterranean carrot-shaped part of the body, about half the diameter and about as long as the above-ground section of the body.
.....from H.Middleditch

The original description of G.erinaceum in Succulenta 64.3.1985, started with a description of the plant body, followed by a single word, penwortel, which probably refers to the root i.e “wortel”. Consulting my 736 page Dutch-English dictionary, I find no entry under “pen” which I can see makes sense when preceeding the word “wortel”. Nothing that would lead me to think that this plant has a thickened tap root.
.....from L.Bercht

I am not surprised that you had a problem with the word penwortel. It refers to a carrot shaped root.
.....from H.Middleditch

Would this be a carrot shaped tap root which is as wide as the plant body at ground level, tapering downwards, or a carrot shaped tap root which is distinctly less than the diameter of the plant body at ground level, then tapering downwards?
.....from L.Bercht.

The tap root on G.erinaceum is by no means as wide as the body of the plant, then tapers downwards.
.....from H.Middleditch

So that when the G.Charles’ Gymnocalycium book reproduces the original description by J,Lambert of G.erinaceum and states “root turnip-shaped” that is not correct - since turnips and carrots are certainly not comparable in shape?

There is evidently a wide diversity of view as to whether G.erinaceum v.paucisquamosum does, or does not, fall within the compass of G.erinaceum. Either way, there would appear to be a clear distinction between G.erinaceum and both G.papschii and G.gaponiii, so that then the suggestion in the Charles’ book that they are synonymous would appear to be mistaken.
.....from H.Till

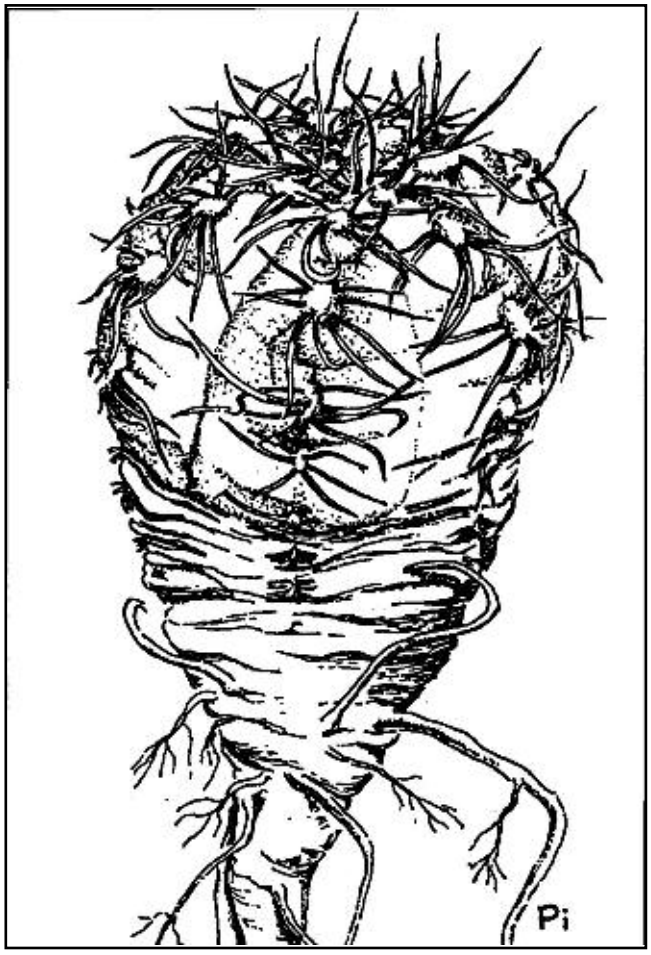
Unfortunately it is frequently overlooked that a species is a fictive term and that in reality populations exist with often quite deviating forms. It is often forgotten that nature does not produce completely identical beings - even twins have characters of their own.
.....from H.Middleditch

In view of the comparison made by H.Till between G.papschii and G.parvulum, and the comment form M.Tvrdik about finding G.parvulum, what do we know about G.parvulum?
.....from G.Neuhuber, Gymnocalycium 7(2)1994

The distribution area for G.parvulum is in the province Cordoba on the west side of the Sierra Grande with many finding places between Panaholma in the north to Los Tapas in the south. Usually these plants are to be found on the lower slopes or at the foot of the hillsides,with their long post root deep in the ground, between grasses. On account of their small size, young plants without flowers are easily mistaken for G.bruchii. The author and many members of the Austrian Gymnocalycium group are aware of many localtions in the above distribution area where both sorts occur. In many instances they can both be in fruit at the same time and so collected seeds of both sorts can be mixed together. On very stony and dry hills of the mountain range near San Luis, observations and drawings of these plants have been studied so that I am now convinced that it is not a variety of G.platense but a good and self-standing species.

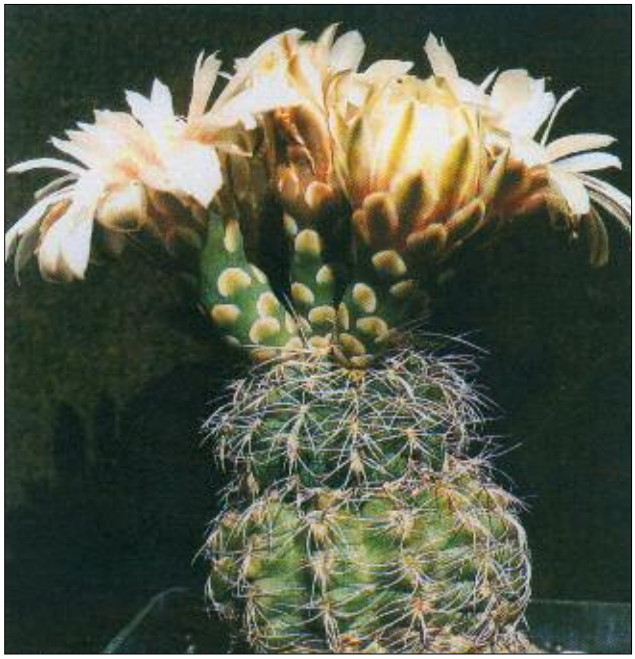
GYMNOCALYCIUM PARVULUM FINALLY REDISCOVERED. By J.Lambert.
From Succulenta 5. No.81. 2002

Gymnocalycium parvulum was originally described by Spegazzini in 1905, under the name Echinocactus platensis v.parvula. As the distribution area for the whole group of E.platensis (and its varieties quehlianum, leptantha, and parvula) there was given “arid mountainous pampean Sierras - Ventana, Curamalal, Ollavaria, and near Cordoba,” i.e. an area stretching over the provinces of Cordoba and Buenos Aires.



Gymnocalycium erinaceum
v. paucisquamosum
J. Piltz Gymnos 11(21) 1994

Gymnocalycium erinaceum
from El Sauce Photo: M. Tvrdik



from Loma Bola Photo: H. Till

from San Javier Photo: H. Till

at San Javier Photo: W. Papsch

Gymnocalycium papschii

GYMNOCALYCIUM 14(3) 2001

Some twenty years later, in 1925, when Spegazzini raised the parvula to a separate species, the finding place was stated to be "the more stony and drier hills of the Sierra San Luis." The fact that this fell outside the previously defined area did not seem to disturb anyone.

Tens of field searchers would for years comb through the hills of San Luis, but in vain. The plants which were acquired by cactophiles under the name of G.parvulum later turned out to be for ever G.quehlianum. So that certain authors (e.g.Backeberg, Piltz) expressed the opinion that the Spegazzini species should be based upon young specimens of G.quehlianum. Surely we can not accept this, since Spegazzini had studied the plants for twenty long years in his collection, and so would surely be familiar with this dwarfish sort. The question that we can well put is whether he ever made a mistake, starting with the finding place. A reasonable supposition, but of which naturally we can never produce proof.

Confronted with this situation, the members of the Austrian Gymnocalycium group thought of another, somewhat eccentric idea. They took hold of the map of Argentina and searched it for another place with the name "San Luis" that did not lie in the province of the same name. They then found it in the west of Cordoba. We know of at least three other places with the name San Luis, respectively in the provinces of Corrientes, Chaco, and Salta. With might and main the Austrians went to their "land of promise" close to the Villa San Luis on the western slopes of the Sierra Grande. They were so convinced of the justice of their gamble, that whatever Gymnocalycium of small dimensions which was to be found there could be nothing other than G.parvulum. A fine example of what the English would call a piece of wishful thinking.

In this way they collected plants and H.Till promptly put pen to paper with the news that the mystery of G.parvulum was resolved and that this species was to be found in a zone between Panaholma and Los Tapias. The diagnosis of Spegazzini was faithfully reproduced but, peculiarly enough, was followed by no detailed description of the harvested plants. Something that allowed that discrepancy between both, to remain.

Nevertheless the photographs speak volumes; not only is the body colour just somewhat too green, but especially the spination immediately attracts attention. Where Spegazzini makes reference to 5-7 short grey spines, of 2-4mm long, here we can count 9-11(-13) white to yellow-white spines of at least 8mm long, which markedly overlap one another.

Also in his more recent description of G.gaponii, G.Neuhuber publishes a picture with the title "parvulum" on which the long spines are to be seen very clearly. These plants can in no way be considered to be parvulum - in our opinion, they belong to a population of G.calochlorum. The argument that this species could not extend to the west of the Sierra Grande is not valid: other Gymnos such as G.monvillei occur along both sides of that Sierra. This is not the only contradiction that we come across now and again in the writings of our Austrian friends. Indeed they sometimes allow themselves to be carried along by their enthusiasm that is not always tempered by the necessary scientific rigour.

To crown his article, Till finally describes a variety under the name of G.parvulum v.amoenum. This consists of a good, valid description, also with a description of the Holotype, but naturally the name is wrong. Therefore this form could be regarded as a variety of G.calochlorum, but in our opinion it is a good, independent species, and so it deserves to be validated under the new name of G.amoenum.

After these somewhat critical but necessary corrections, we can come to our own experience. In contrast to the Austrian approach, our discovery of G.parvulum was not in the least the result of forethought, but came about by pure chance. On the 7 of November, 2001, we found ourselves at the Villa Ojo de Agua at the southernmost extremity of Santiago del Estero and we had decided to travel to Salsacate. We had planned a route via San Francisco de Chanar, San Pedro Norte, Ischilin, and Ongamira, thus finally attaining our objective near Cruz del Eje. A direct road ran from Villa Ojo de Agua towards San Francisco de Chanar, but this was said to be in a very poor condition and on the advice of a policeman we first followed the main road to San Miguel, from where we then turned off right towards San Francisco de Chanar. In this way we found ourselves on a stretch of road that was not anticipated - and then it happened!

About half way, we stopped at a spot with palm trees, bushes, grass as well as moss and lichen between the stones. It was not long before we came across a small Gymnocalycium, hidden under this rather thick plant growth. We collected a few specimens and quite quickly, I grasped that it must be a dwarfish species, not only on account of its small dimensions, but also in view of the fact that a specimen of hardly 2cm in diameter already bore a fruit. A couple of specimens were taken to plant out in the greenhouse. To begin with, I did not think immediately of G.parvulum, but the more I observed these plants, the more perfect became apparent the conformity with Spegazzini's species. Until finally I no longer had any doubt about it.

So that here follows the detailed description of the plants as I could personally observe, from which one can see that all characters described by Spegazzini are to be found there.

The species developes a short, thick taproot from which a series of secondary roots push deeper into the ground. The body is a dull green, flattened globular, with a diameter of up to 30mm and a height of 20-25mm. There are 10-13 ribe separated from each other by deep, somewhat sinuous vertical grooves, and divided into rounded - somewhat angular - tubercles. There are not any cross grooves. The areoles are very small, about 1 x 0.5mm, whitish. There are 5-7 radial spines, spreading and pressed against the body, that will be no more than 4-5mm long; their colour is greyish-white with dark bases. Central spines absent.

The flower bud is covered with very dark, blackish-green scales, with a yellowish-white margin. The flower arises in the centre of the crown; it has a height of 40mm and a diameter of 37mm. The pericarpel is slender (Spegazzini - tubo perigoniali gracilis) with a height of 20mm and a diameter of 5-6mm. The colour is dark bottle green and the scales display a broad whitish-yellow margin. The outer petals are narrowly spathulate - white with a broad dark green midstripe and a carmine-pink base. The inner petals are lanceolate and coloured a uniformly ivory white. The throat is a carmine pink. The stamens stand in two series, they are white with cream-coloured anthers. The style is yellowish-white with a pink foot and is 10mm long. The

stigma has 8-10 white lobes, 3mm long; it stands above the lowermost stamens but remains below the uppermost stamens, so that it also remains invisible in an open flower. The fruit is dark olive green, spindle shaped, with a height of 20mm and a diameter of 11mm. The scarce scales are broader than high, with a small sharp point, and a broad whitish-pink margin. The seeds are Ovatisemineae type, more or less globular, 1.2 x 1.1mm. The testa is coated with a light brown cuticle. The hilum is flat and round, yellowish white.

The species appears to be clearly related to G.leptanthum, from which it is distinguished by the smaller dimensions, the less numerous and shorter spines, and the smaller flower with paler coloured components. Noteworthy is the fact that both sorts were initially described by Spegazzini as varieties of Echinocactus platense and that twenty years later both sorts were raised simultaneously to independent species. Finally it also needs to be mentioned that both species occur in the self-same region i.e. the north of the province of Cordoba.

.....from H.Middleditch

Bearing in mind that both G.platense and G.parvulum produce flowers which are materially longer than most other species of Gymnocalycium, and were probably longer than any other Gymnocalycium known in 1905 when they were originally named by Spegazzini as Echinocactus platense v.parvula. it is understandable that he might have looked upon them as related to one another. In 1925 he elected to separate parvulum as a separate species.

.....from W.Till

In the article in the 2002 issue of Succulenta, J.Lambert describes a plant which he found which he believed would be G.parvulum. However, in fact he had found a plant which was later described as G.parvulum subsp. huettneri F.Berger. The description by J.Lambert in the 2002 Succulenta paper therefore referred to the latter taxon - Lambert was not at the locality of G.parvulum!

.....from H.Middleditch

Enquiries to date have found only one of our UK members who is growing a plant of G.parvulum, so that few comments or observations on plants with this name can be offered at this time. Nor has it been possible to find any “San Luis” in the area for where G.parvulum is stated to occur in the Austrian “Gymnocalycum”.

.....from L.Bercht. Succulenta 2010.

There is a Villa San Luis to be found on the map between Villa Cura Brochero and Panaholma. [These two place names are now on the updated Sierra Cordoba map - H.M.] I would be inclined to place the G.“parvulum” so-named as found by J.Lambert, as a form of G.stellatum.

.....from H.Till. “Gymnocalycium” 7(2)1994.

The habitat location for G.parvulum quoted by Spegazzini in 1905 appears to be unclear and misleading. In 1925 Spegazzini quoted a specific habitat location for his G.parvulum as “in the more stony and dry hills of the sierra of San Luis”. It is important to note that the word “sierra” was written with small letters and so it can be read in translation as “mountain ridges near the place San Luis”. The Villa San Luis is on the road between Villa Cura Brochero and Panaholma.

.....from H.Middleditch

In Gymnocalycium 7(2)1994 there is a habitat picture of G.parvulum GN 91-351 with about six heads, but these could be either one clumping plant or a number of individual plants which have germinated and grown from some seed which has fallen at that spot. Similarly for the four heads close together in the habitat picture from G.Neuhuber in Gymnocalycium 9(3)2001. There is also a picture of a G.parvulum GN 91-361 in cultivation in the 7(2)1994 article which has one small offset. However, I have not been able to find in these articles any clear statement to the effect that G.parvulum does offset and produce clumping plants

.....from H.Till, “Gymnocalycium” 7(2)1994

By Villa San Luis are many plants which conform with the description of G.parvulum (Speg) Speg. which have been described as G.proliferum Bkbg. and as G.calochlorum v.proliferum Bkbg.

.....from H.Middleditch.

This particular observation would suggest by implication that G.parvulum does produce offseting plants in habitat.

.....from M.Tvrdik.

We visited Panaholma with a view to finding G.gaponii, which we hoped to see in that locality. Unfortunately we did not know exactly where to find it growing, and so we only found G.parvulum there. These plants grow in enormous clumps and in large numbers in the long grass, whereas we now know that G.gaponii is to be found in this locality mainly on the banks of streams and grows as single heads. The G.papschii that we saw at its type locality near San Chavier do not at all resemble G.parvulum, and moreover they grow as single heads and only in small numbers.

.....from H.Middleditch.

The pictures from M.Tvrdik of G.parvulum which he came across in habitat, growing on what appears to be outcrops of rock, are of plants with up to several score of individual heads which form a clump of appreciable diameter, but with all the heads growing to almost the same low height, apparently of a flattened globular shape.

.....from P.Crewe.

Looking through the STO field numbers I see that Piltz lists STO 521 as G.bruchii from Loma Bola, whilst Bercht lists STO 521 as G.parvulum from Loma Bola.

.....from A.Lorenzini

I am growing a plant of STO 521 which is named G.papschii

.....from M.Tvrdik

The plants of G.parvulum (or G.papschii) from Loma Bola which are lodged in collections in this country are decidedly columnar. What this plant from the locality Loma Bola may be is truly a problem.

.....from G.Neuhuber

The plant from Loma Bola is to be described shortly by Mr.Gapon in Russia.

.....from H.Middleditch.

The distinct similarity in the appearance of the body and the spination of plants of G.amerhauseri, G.gaponii, and G.papschii in habitat which are pictured in the Austrian "Gymnocalycium" publication would appear to raise the question of just what distinctions do exist between plants of these three species names.

FALSE RED SPIDER MITE

.....from H.Middleditch

Over the course of the last two or three years I have found no small number of my plants have developed a pale brown covering over the whole of the entire surface of the body and then ceased to grow at all. This seems to resemble damage from red spider mite but there has never been a single sighting of red spider mite on any of the affected plants. Some years ago a contact in Switzerland said that they had discovered that the problem was a fungal growth, but the anti-fungal spray required was not available in this country.

.....from R.Moreton

The same problem appeared on a number of my own plants and I enquired from the Royal Horticultural Society if they could identify the cause of this problem. I had not seen any sign of red spider mite on these plants.

.....from The Royal Horticultural Society

The cacti and succulent samples which you sent to Wisley were infested with a sap-sucking mite known as false red spider mite - probably the species Brevipalpus russulus. These tiny mites are orange-red and have flattened bodies. They suck sap from their host plants and this checks the plant growth and causes discoloration of the plant surface. Once cacti or succulent plants have been badly damaged by these mites, it is unlikely that they will make a good or rapid recovery. It may be advisable to remove those plants that are showing signs of damage as a means of stopping this pest from affecting a wider part of the collection.

Based on the tests carried out here, I can recommend the following treatments for control of Brevipalpus mites. First, Bifenthrin which is the active ingredient in some pesticides available to amateurs. This was used at the strength recommended for control of red spider mites. It effectively killed adult Brevipalpus but had no effect on the eggs. To gain complete control, therefore, more than one treatment is needed, in order to kill the mites hatching from the unaffected eggs after the first spray. Secondly, horticultural spraying oil; the value of light mineral oils as an insecticide has been known for some time. Their action is due not to being toxic to the pests, but is a physical effect, clogging the breathing pores of the insects and thus smothering them. The product I tested was "Horticultural Spraying Oil". Although a professional product, it can be purchased and used by amateurs. Neither of these chemicals showed any harmful effects to the plants when used as recommended.

.....from H.Middleditch.

Armed with this information from the RHS, I took a look at one or two of my infected plants which were partially covered with the troublesome pale brown skin, with the help of a hand lens. Whilst I believe that there were many extremely tiny red dots to be seen, I could not be certain just what they were. But the next move is to try and find an insecticide which includes the recommended Bifenthrin.

BOOKS AVAILABLE

.....from H.Middleditch

It will be some fifty years or so since I arranged a series of annual coach trips to various cactus collections on the continent, when several of the participants on each trip remarked on the range of South American cacti which were to be seen, that were pretty well unknown here. especially plants from Chile. It was to provide information about these plants that the Chileans was founded. At that time, only one of our UK members had been out to South America, paying a visit to Lima. As very little information was readily available about the climate, botany, geography, topography, plant or animal life in South America, second hand book lists were regularly checked and frequent purchases were made of books providing such data. Now that there are several field trips by Chileans members each year, we are very well off for first hand accounts of cacti and their surroundings in these countries. The books, which were originally accumulated in the absence of these observations, are now surplus to requirements and are available at a purely nominal cost. A list is available on request.

CHILEANS PICTURE LIBRARY

.....from A.Johnston

An opportunity has arisen to scan the Austrocactus slides and transfer them on to a CD. All being well, it may be possible to do this in the course of this year. Some pictures are of provenanced plants and there are some slides of plants in flower and others in fruit.

.....from G.Slack

Most of the suitable slides from the Chileans' Library have been scanned and transferred on to a CD and I have also added to them a number of pictures of my own plants, together with others that members have sent

to me. There are also some close-up pictures of examples of seeds from several Gymnocalycium seed groups.

However, no small number of these pictured plants are without a provenance and, in addition, not all species have pictures of both flowers and fruit. It would be valuable to add pictures of plants in habitat, so if any members would care to offer me any, that would be appreciated.

Any offer of such pictures would always be welcome either by e-mail or on slide. and slides would always be returned if so requested. A copy of the CD is now available to members at a cost of £1.60 which includes postage, packing, and the cost of the CD, which can be returned if any member wishes to do so.

.....from P.Harper

I am fortunate in having a nice selection of plants of Pyrrhocactus which came from A.Wessner in Germany, some of which are of flowering size. During this year I would expect to be able to put pictures of these plants on to a CD which would be available to members. I would appreciate hearing from any member who could offer pictures of any of these plants taken in habitat in Argentina.

.....from P.Hoxey

I am in the process of putting a number of photographs of Matucana on to a CD which will be available to members, both of plants in my own collection and of plants which I have seen in habitat in Peru. This covers a selection of individual species and I would be very pleased to hear from any member who may have a photograph of any Matucana in flower or fruit, or of flower sections. Photographs of plants of known origin, either of old collected plants or plants grown from habitat collecte seed, are especially welcome. Also any photographs of plants seen in habitat as on my own field trips I was only able to see a number of different species.

.....from P.Down

Whilst I do have a fairly comprehensive collection of Parodia, for many years J.Brickwood concentrated on collecting Parodia and on gathering information on these plants from over eighty cactophiles from all over the world, many of whom had seen these plants in habitat. He has now given up his interest in Parodia and has disposed of his collection. But I do have his Parodia CD which is an encyclopedia of all the pictures and minute detail which he had put together. This includes hundreds of photographs of these plants in habitat.

A copy of this CD is available on loan to any Chileans' member at a cost of £1.60 at current postal rates. This CD includes list of all knowm Parodia names, of field numbers, photographs and distribution maps of the various species, together with notes on cultivation. This data was copyrighted by J.Brickwood so that it is available only for private use and not for public showing, due to a great deal of the data sent to him being provided on this understanding.

.....from J.R.Kirtley

I am in the process of putting on to a CD, pictures of my own Sulcorebutia, many of them having a provenance, together with some from the Chileans' Slide Library. If any member can offer me digital pictures of Sulcorebutia showing either spination. body form, or flower detail, they would be very welcome. I would also like to have any pictures taken in habitat. A CD is likely to be available towards the end of the year

.....from I.Crook

Recently I was able to acquire a fine selection of Rebutia plants from one of our Chileans' members, which has significantly increased the number of Rebutia species - including Aylostera and Mediolobivia - in my greenhouse. I intend to compile a photographic record of these plants on a CD which should be available to members later this year. There are some Rebutia species which I am not able to include on the CD and I would be pleased to hear from any member who may be able to provide me with such pictures. The aim would be to include pictures of plants in flower and in fruit and flower sections. In addition, any pictures of plants in habitat would naturally be extremely welcome.

.....from R.Purslow.

My collection of Lobivia runs to several thousand plants, it being my main area of specialisation over the past thirty years. In future I hope to be able to take some digital photographs of a number of these plants for use in the Chileans picture library. I have been expanding my collection of Echinopsis and Trichocereus. I would be interested in obtaining any fairly recently collected, well documented, material of the above groups.

.....from J.Arnold.

I have seen and photographed Haageocereus on my visits to the north and to the south of Peru and I also grow a good number, though so far flowering has been restricted to the H.decumbens sort. It is intended to transfer my photographs on to a CD. I will be very pleased to hear from any members who may be able to provide pictures of these plants in cultivation, particularly if they are in flower or fruit.

.....from P.Crewe.

My own collection includes a selection of Lobivia, some with provenance and of flowering size. I have taken digital photographs of some of these and plan to copy them on to a CD to be made available to Chilean members. But there are plenty of species and forms which are not represented. If any other members have digital photos that they would be happy to share, I would willingly include them. Photos of plants in habitat would be particularly welcome. There is a possibility of transferring slides to the CD in the future.

.....from H.Middleditch

It is anticipated that a picture CD could be provided for a cost of about £1.60. which may rise if UK postal rates change in Spring as they have done for the last two or three years. To borrow a CD it would be advisable to first contact any member who has a CD available to check the cost. For an overseas loan, please enquire for the cost. Copyright in the pictures will remain with those members who supply them.

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Chileans Picture Library

Austrocactus	A.Johnston, 11 Malvern Road, Scunthorpe DN17 1EL
Cleistocactus	T.Lavender, Kalanchoe, Market Place, Tetney DN36 5NN
Echinopsis	R.Purslow, 75 Littleheath Rd., Selsdon CR22 7SJ
Frailea	R.Gillman, Oddyns Farm, High Cross Lane, Little Canfield CM6 1TF
Gymnocalycium	S.G.Slack, 50 Sunnyside, Edenthorpe DN3 2PH grahamandirene@slack2830.freeserve.co.uk
Haageocereus	J.Arnold, Suffolk House, 2 Oak Hill, Washingbrough LN4 1BA
Lobivia	P.Crewe, 6 Douglas Rd., Hazel Grove, Stockport SK7 4JG
Matucana	P.Hoxey, 34 Stonehill Road, Great Shelford CB2 5JL paul@hoxey.com
Melocactus	M.Madders, 1 Potheridge Gate, Merton, EX20 3DN
Notocactus	P.Moor, 60 Milton Hall Road, Gravesend DA12 1QW philipmoor@blueyonder.co.uk
Parodia	P.Down,24 Brackley way, Totton. SO40 HN
Pyrrhocactus	P.Harper, 46 Mortimer Rd., Rayleigh, SS6 9NX
Rebutia	I.Crook, Croshaw, 3. Clarendon Rd., Audenshaw M34 5QB.
Sulcorebutia	J.R.Kirtley, 11 Fire Station Houses, Alnwick NE66 2PB jimrkirtley@talktalk.net
Tephrocactus	R.K.Hughes, 16 Ashbourne Avenue, Bootle L30 3SF
Weingartia	A.Glen, 5 Hall Grove, Macclesfield SK10 2HQ aglen@tinyworld.co.uk

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